

MASSAGE
ITS PRINCIPLES AND PRACTICE



MASSAGE

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BY

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WITH AN INTRODUCTION

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With 135 Illustrations and an Appendix.



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PREFACE.

THIS book is not intended to serve as a Text-book for the massage student. For such many books are already on the market, and there is no need to add to their number. Moreover, it will be recognised by the experienced masseur that many of the views herein expressed are unorthodox and are therefore dangerous diet for one whose main object in the immediate future is to satisfy examiners.

I have undertaken the heavy task of writing a book in war-time, at the request of my publishers, with two main objects in view. The first is to try to point out, as far as I can, to the practising masseurs and masseuses, what I consider to be the *rationale* of massage treatment, and to endeavour to introduce into their technique more generally than is at present the case the care and gentleness, which appear to me as the key to the riddle of the exact nature of the massage which will most speedily yield a successful result. The six months' training at present in vogue is totally inadequate for efficiency or thorough teaching. My aim is to supplement both as far as can be done by the study of a book.

The second object I had in mind—which, I fear, is less likely to be realised—was that I might be able to place in the hands of my professional brethren a book to which they can refer when issuing instructions to their masseurs. A medical man who fails to issue adequate instructions may often be responsible for the failure for which his masseur is blamed. Another fertile source of disappointment is found in the lack of experience inseparable from a course of training limited to six months.

When a medical man orders massage he should not try to hand over his responsibility to the masseur. He should consider the prescription of massage treatment in the

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same light as he would consider that of a potent drug and watch its effects no less closely, varying the dose and the nature of the dose from time to time according to indications. If he leaves the details of the prescription to the masseur, he can only expect to encounter the effect of an overdose with considerable frequency, and, less often, fail to note the improvement anticipated owing to insufficiency of dosage. But if he is to prescribe and intelligently to watch the effect of his prescription, it is essential that he should render his instructions intelligible to his masseur, should know what effect he hopes to see and of what danger signals he must beware.

Much of the success which is attending orthopædic surgery in its applications to the necessities of our wounded could not be attained without the concomitant of massage. Manipulation and exercises must often precede, should frequently accompany, and must almost invariably follow, effective work by the surgeon. Without them his task in many cases would be either impossible or futile.

Massage is a dual agency, of prime value in either aspect. It may disclose (and aggravate, if we are not careful) latent mischief, as well as alleviate the danger which is apparent; and it can expedite, confirm, and finally give effect to the amelioration made possible by surgery. In either case the primary reason is the fact that massage can be made to originate passive movement, movement not simulated, though it may be unconscious, nor even, perhaps, the result of the patient's volition, though exerted by him. At times we must gain our ends, as it were, by stealth. If movement of this kind be the first objective, the method by which it is to be induced can have little in common with the strenuous procedure in which alone some masseurs still indulge. For the present purpose, at any rate, no great aid would be expected of such an auxiliary. Methods may bear small resemblance to one another save in name; and I have endeavoured to point out the vast difference that exists between what I have called "relaxed" and all other forms of mobilisation.

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Whether massage, manipulation, and mobilisation are to be for or against us to-day, when we cannot afford to ignore them, is a question first of principle and then of method. I have therefore endeavoured to set forth both how and why the various kinds and degrees of each—as a persuasive, and rarely as a coercive, agency—should be severally applied. One thing I have felt we have long needed, namely a considered study of principles such as underlie treatment by relaxation as well as that by contraction. The foundation of success in the restoration of function after disease or injury is the appreciation of the nature of true passive movement, and the skilful gradation to active movement, which must be successively partial, universal, and simultaneous. The prescribed processes and exercises, to justify their performance, so draw out or educate the degenerate but dormant abilities of injured muscles and tissues as to enable them to complete the recuperative course by their revived power of spontaneous action.

One word is necessary on the subject of the “exercises” so constantly referred to in the text. Certain exercises are described in detail. It must not be supposed, however, that this is done with the least idea that these can in any way replace or supplant the system of exercises we know as “Swedish.” For all time these must remain as a pattern and guide. Whenever reference is made to exercises, the additional word “Swedish” should therefore be understood. The exercises described in detail, and which are not to be found in any Swedish table, are recorded only on this account. I have found them of service as an auxiliary to Swedish exercises; my hope is that others will share my experience. Moreover, treatment by Swedish exercises requires trained teachers, of whom, in the present emergency, the supply is inadequate. Some substitute has to be found, and I have tried to suggest one.

The final stage of convalescence may be long and tedious, perhaps a ‘year’s or two years’ journey. The problem of the treatment to be given in such cases, and

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of its administration, has to be faced and solved, if men who have suffered in the nation's cause are not to lose the chance of regaining the greatest measure of physical ability that still is possible to them. It is one of the many questions which will demand solution and will get it, but not without much thought and labour.

The list of those who have helped me to prepare this book is a long one.

To Sir Robert Jones I am indebted for the valuable opportunity of working for him at the Military Orthopædic Hospital, Shepherd's Bush; and he has now added to his many kindnesses that of writing the Introduction which follows.

Miss Randell, Sister in charge of the Massage Department at St. Thomas' Hospital, has laboured indefatigably with my manuscript from beginning to end, and her help and advice have been most valuable. Miss J. H. Wicksteed, my Head Masseuse at the Military Orthopædic Hospital, has done the same, and has also spared many hours of her small leisure to aid me in preparing the illustrations.

These I owe to the admirable skill, care, and patience of Mr. F. Howard Lewis, Photographer of the Military Orthopædic Hospital. Most of the photographs were taken in this hospital by kind permission of the officer in command, Major J. J. Jenkins. All but seven are original. Five of these are illustrations of the use of slings borrowed from my former book, *The Treatment of Fractures by Mobilisation and Massage*, the sixth I have modified from Sir Robert Jones, while the seventh, Fig. 64, is the photograph of a patient under the care of Captain Bristow, which he has published in his recent *Treatment of Joint and Muscle Injuries*.

The thankless and laborious task of correcting proofs has most kindly been undertaken by Mr. H. C. Streatfield, C.I.E., his wife and daughter, the two latter being most valued members of my staff at the Orthopædic

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Hospital. My readers, no less than myself, owe them a debt of gratitude. Other members of this staff who have helped me are Miss G. D. Innocent and Miss J. Milne.

My relief was great when Mr. George Bethell, Registrar of the Medical Society of London, kindly undertook to prepare the Index, without which any value the book may have would be very materially less.

J. B. M.

LONDON, W.

INTRODUCTION

BY

SIR ROBERT JONES, C.B., COLONEL R.A.M.C.,

Director of Military Orthopædics.

THE value of massage as an aid to the orthopædic treatment of our wounded is now too well established to require defence. It cannot, however, be denied that many of the ideas prevalent as to the methods of its use are often very vague, and surgeons who have made a close enough study of the subject to give definite directions to the masseuse are still fewer than they should be.

In these pages we have an exposition of his own observations and practice by a physician, an acknowledged master, whose enthusiasm for his subject is tempered by a wide clinical experience of success and of failure.

It cannot be too frequently stated that treatment by massage must be directed and controlled by the surgeon treating the case. There is no half-way house between success and failure: massage either does good, or it does harm. The harm done may not be to the local injury from which the patient is suffering, but to his psychological attitude towards his own case. In hospitals which I visit it is common to meet patients who say they have had months of massage and are no better. There could be no stronger condemnation of the system by which the massage is controlled.

We still frequently find that cases are sent to the massage department with no detailed account of what has been done by the surgeon, of the plan by which he has been trying to restore function to a disabled limb, or of the part he wishes massage to play in the future course of his treatment. The responsibility rests on the surgeon, not on the masseuse. Success in treatment depends on

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loyalty between surgeon and masseur or masseuse: loyalty on the part of the surgeon in giving precise explanations of what he wishes, loyalty on the part of the masseuse in faithfully carrying out those instructions and immediately reporting any condition which she may observe.

When this close alliance is maintained, massage may be successfully employed as a preliminary to, as a concomitant with, and as a sequel to active surgical treatment. As a preliminary to surgical treatment, it may be of diagnostic value when the surgeon wishes to perform some operation, but the cicatrices from previous suppuration are an impediment to a successful operation. He may ask the masseuse to loosen the scars by delicate manipulation, but must warn her that the least sign of inflammatory reaction must be reported, for nothing except passive movement will arouse the activity of a latent focus of inflammatory mischief more quickly than massage. A preliminary course of massage will therefore serve to indicate whether the case is ready for surgical interference or not. It also prepares the way for operation and may even render it possible.

As a concomitant to surgical treatment, massage may be employed to alleviate pain, reduce œdema, assist circulation, and promote the nutrition of tissues.

As a sequel to operative treatment, it serves to restore the nutrition of tissues, and initiate the patient into an appreciation of muscle sense and movement lost by months of disuse following a severe septic injury, thus paving the way to recovery of voluntary muscle action, which is the ultimate aim of all orthopædic treatment.

In the following pages the constant reference to the use of "exercises" should serve to emphasise that massage should rarely constitute the whole of treatment. Exercises should almost invariably find some place, and their skilful prescription is an art which calls for long, careful, and special study.

The responsibility of the masseuse to the surgeon must be based on a proper instruction in the idea or plan of

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treatment he is following. The masseuse must be technically well trained in manipulation, must have a sense of loyalty to the plan she is asked to follow, but must also have an intuitive sympathy with the patient, quick to appreciate when her manipulation is causing pain and may be harmful, quick to detect signs of inflammatory reaction and at once to report them, and most of all, quick to detect signs of recovery and to point them out to the patient, thus rousing in him an interest in his own progress, which is half the battle, for the psychological element must be kept in view. Without this last gift of intuitive sympathy the most perfect technical knowledge is useless. The convalescence also may be long and tedious, but in the pages which follow the reasons for perseverance are amply illustrated.

ROBERT JONES.

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CHAPTER I.

A PERSONAL NOTE.

I HAVE said in my preface that many of the views expressed in these pages will be unorthodox, and my first attempt is to place on record the "reasons for the faith that is in me." I hope that I may be forgiven a few personal words in explanation of the origin and growth of this faith.

I owe my first and, as it were, involuntary attempts at massage to the House-Surgeon to Out-patients under whom I first began my clinical experiences as a student. He was discontented with what in his own student days he had seen of the treatment of Colles' fractures; and having heard in the course of his studentship that the after-stiffness of this accident could be prevented to a large extent by so-called "early movement," he proceeded to carry out this theory with more zeal than consideration for the feelings of his patients. Working under his instructions I noted that the patients kept their eyes glued to the injured part and that their preparations for resistance usually commenced long before the movement was attempted. I thought I might do better by placing one hand over the site of fracture, using it as a sort of wristlet for support. Finding my patients still seemed to see each attempt at movement and to resist it accordingly, I next tried passing my hand up and down—not with any idea of rubbing the part, but merely to effect a distraction. Great was my surprise to be greeted by: "Oh, Doctor, that is lovely; do go on." I went on, and

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I soon discovered that the amount of movement that I had previously attained by the exercise of considerable force, and at the expense of much pain to the patient, was now procured painlessly and without any attempt at force. I watched these cases closely, and soon saw that they improved in what appeared to me then an almost miraculous manner, compared with those who were treated by forced movement, let alone those who were subjected to prolonged splintage.

On receiving my first house appointment I decided to experiment further, and, encouraged by results, successfully extended the treatment to other fractures and injuries. At the end of six months I went to Paris and there commenced my close friendship with the late Just Lucas-Championnière. Though I never saw him treat a patient, I became his ardent disciple ; and on my return home I resumed my work with increased zest. I now investigated the methods of treatment applied to conditions other than those of recent injury, and formed the opinion that there were two distinct forms of massage : one applicable to recent injury and the other to all cases not coming under this head.

The first thing that made me doubt the integrity of this opinion was a story told me by Championnière, when, on a subsequent visit, I placed my theory before him. There was a masseur in Paris whose name was anathema to the medical world, though the general public formed a different view. His income was the envy of many of the leading medical men of Paris, but his methods he would not divulge. Then his son fell ill—I believe the illness was general peritonitis—and my old friend was consulted. He operated, and devoted himself to the case, which finally resulted in recovery. In gratitude, the masseur for the first time told a medical man the secret of his success. It may be stated in a word : “ I never hurt a patient ! ” That was all, but it started a new line of thought. Since then I have had opportunities of watching various workers—English, French, Swedish, Italian, Danish—and have tried to select all that I saw good, and discard what seemed

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to be bad, in their methods. The result has been that I sometimes feel that I am rather in the position of a certain lady whose views have been recorded by Walsham How. A minister went to remonstrate with her on the fact that she had forsaken all orthodox forms of worship, and held a service every Sunday for her gardener, James, and herself. He thought, apparently, that the matter could be settled easily by asking whether the old lady really thought that she and James were the only two people who would be saved. He was somewhat taken aback by the answer: "Well, I am not so sure about James." Be that as it may, the views expressed in these pages are founded on the result of several years of close observation, study, and experiment. It is possible some of my deductions are erroneous, but at least they are capable of being argued and are not merely arbitrary.

My hope is that the following pages may be regarded as the outcome of the actual experience of a medical man who has really studied massage, its theory and practice—a being all too rare at the present time. I trust that the record of this experience may help my medical colleagues to understand and to interest themselves in the work of their masseurs,¹ besides helping the latter to appreciate more fully the medical man's point of view in connection with the work they are doing for him.

¹ Throughout this book the word "masseur" should be regarded as a generic term to include masseur, masseuse, and medical gymnast.

CHAPTER II.

GENERAL PRINCIPLES OF MASSAGE TREATMENT.

I.—THE REFLEX EFFECT OF MASSAGE.

To use massage aright we must consider it entirely as a means to an end, the end being restoration of function. Every movement performed should have this end in view ; and the worker should be able to show, in reasoned detail, what effect it is hoped will result from each movement of hand or finger, and what part this effect is expected to play in the restoration of function. More than this, there should be a reason for every attitude assumed by the worker, and for the position in which the part under treatment is placed—which joints are flexed or extended, which muscles are kept in tension and which relaxed. Thus in treating an arm it may be wiser to treat one patient sitting up, another standing, and a third lying down. For the treatment of the leg one patient should be recumbent, another prone, and a third sitting. Attention to details of this kind may make all the difference between success and failure, and so it is absolutely necessary that we should regard them as essential, and be prepared to support by reasoning and argument every detail of our treatment however apparently insignificant.

Massage being then merely the means to an end, we must first consider what effects we may expect from the exercise of these means.

There are two, and only two, possible effects of any movement of massage :—*reflex* and *mechanical*.

Reflex Action of Massage.

A. IN MASSAGE OF THE LIMBS.—It is still possible to find those who are inclined to scoff when the “ reflex

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action of massage " is mentioned. It is, none the less, as important as the mechanical effect. The desire for massage is instinctive, and several points in massage treatment may be learnt from the most simple of nature studies.

A dog whose leg is run over seeks some quiet spot, lies down, and begins to lick the injured leg with a slow, gentle, rhythmical movement which is perfect because it is natural, and which should serve as a pattern to all masseurs. When nature prompts the animal thus to treat his injured limb—his treatment is not necessarily applied to a wound, as it is the same whether the skin be broken or not—and when we see that the slow, gentle, rhythmical massage brings him ease and comfort and at the same time hastens his recovery, why should we not copy as best we may and apply similar treatment to our injured fellow men? Again, when we sit down after a heavy day of mental effort, perhaps the most common action is for the hand to be passed lightly and gently over the tired eyes and the forehead, with the caressing movement that instinct has taught us will bring a sense of relief. Surely, then, similar treatment is indicated for those who suffer from the chronic fatigue of neurasthenia. We know from nature and from our own experience that this stroking massage is capable of yielding comfort, and yet it is so light that its effect cannot conceivably be due to mechanical causes: the only possible way, therefore, in which it can act is by nerve reflex. Moreover, we all recognise certain reflexes which result from skin stimulation—the abdominal, plantar, and cremasteric reflexes. We also recognise the involuntary emptying of the stomach on tickling the back of the throat, and, almost the converse, the relief of hiccough that can be secured by tickling the anterior nares. Is it unreasonable to suppose that, if one form of skin stimulation can produce a muscular contraction by reflex, another form of stimulation can secure relaxation?

In every-day life we recognise the beneficent effect of massage every time that we rub our eyes hard to reduce

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intra-ocular tension, or press upon temple or forehead after a day of great fatigue, when the blood pressure is high, in order to secure the relief that follows local reduction of blood pressure, even though the general pressure is not altered. It is thus that we instinctively invoke the aid of massage for its mechanical effect.

Passing from argument to fact, those who have once seen the treatment first devised by Lucas-Championnière, applied to a recent fracture cannot but admit that they have witnessed the result of a profound reflex. A patient may have suffered severe comminution of the neck of the humerus. Before treatment he is in obvious agony, and on inspection the injured arm is visibly shorter and thicker than its fellow. Under the influence of massage the pain passes off, and then the arm slowly becomes longer and thinner under our touch, till finally it may be difficult to note the difference between the two arms. In the same way, it is often possible to overcome the spasm that causes the shortening and deformity due to muscular spasm after fracture of the femur—a shortening it may be almost impossible to correct even when aided by anæsthesia. By massage we can at least relieve the spasm, even if we cannot always reduce the deformity.

If massage is applied to a limb which has sustained a recent fracture, one of the most noticeable results is the transient nature of the subsequent swelling. This is often attributed to the mechanical effect of the massage, and yet the swelling may subside with equal rapidity whether the stroking is performed centrifugally or centripetally. In the former case mechanical action is inconceivable. If, however, we are only seeking a reflex effect, it is clearly immaterial whether our stroking is performed upwards or downwards.

B. IN MASSAGE FOR DISEASES OF THE NERVOUS SYSTEM.—In the treatment of an irritable neurasthenic, the victim of insomnia, if we watch the nervous irritable twitching slowly pass off as we proceed, see the anxious facial expression change to one of repose, and finally hear

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the regular deep breathing of a sleep, which is so sound that we can adjust the bed-clothes, wash, dress, turn out the light, open and shut the door, all without disturbing the sleeper, we can feel no possible doubt as to the reflex action of the massage we have given. Sometimes it is taught that the effect is due to relief of "congestion in the head." The patient with arterio-sclerosis and high blood-pressure, who sleeps badly, may owe his trouble to "congestion," but the typical victim of insomnia has a low blood-pressure, and intra-cranial congestion is almost inconceivable. Moreover, many patients become drowsy before the head or neck are touched, and, when they are treated, the touch is far too gentle to secure any mechanical effect whatsoever. Further, if massage, of the type that aims at securing mechanical effect, is administered to the neurasthenic with firmness and vigour, the result is often disastrous. This point will be further elucidated (see Chapter XIX.).

A medical man practising massage in the United States wrote to the author that he even made use of the reflex action of massage as a means of confirming diagnosis. Thus, if a patient were the subject of persistent headache or neuralgia, he relied on massage to show whether the patient should be subjected to operation for resection of a part of the Gasserian ganglion. He appears to believe that, if the pain can be relieved by massage, all idea of organic disease can be dismissed; if the pain is not relieved, its persistence is in itself sufficient evidence of organic trouble to justify operation. This claim would seem to be extravagant, but it is none the less worthy of record, as showing how profound is the faith in the reflex action of his massage on the part of a competent, if enthusiastic, worker. Incidentally it should encourage us to hold out massage as a hope of relief to those sufferers from facial neuralgia and headache, who owe their affliction to no cause that can be discovered. Assuredly the amount of relief that can be given is often great. It is particularly effective if the pain is due to fatigue, provided, of course, that the massage movement selected is suitable. Other-

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wise failure is certain, and it is possible that the trouble may be greatly aggravated (see Chapters XIX. and XXII.).

C. IN ABDOMINAL MASSAGE.—If the abdomen of a pithed frog is opened, the lightest tap on the exposed bowel is capable of producing a double effect. The portion of gut tapped passes instantly into spasm, and cardiac inhibition takes place simultaneously—surely a deleterious reflex. This reflex inhibition should always be kept in mind while performing abdominal massage.

Yet abdominal massage, as taught and performed in many schools, would appear to have only a mechanical effect in view, so heavy are the movements and so great the pressure exerted. Why students should be left with the impression that treatment of the abdomen should entail the expenditure of much force is not quite clear, but so it is. The root of the evil may lie in the hurry that is inseparable from the attempt to accomplish too much in a limited time, or in a lack of comprehension of what it is that they wish to attain. If we regard our massage merely as a means to an end and consider how we wish to achieve that end, we shall rarely indeed apply heavy massage to the abdomen.

It is possible that by mechanical means we can help empty a dilated stomach, and we can certainly assist in the softening and moulding of scybala, in those very exceptional cases where they are palpable, and therefore amenable to manipulation. In this event we can also assist their passage along the bowel.

The undilated stomach is completely hidden by the ribs, except for a minute area below the ensiform cartilage, and the only portions of the bowel, in which we can be certain of the direction of the passage of the contents at any given moment, are the ascending and descending portions of the colon. In the transverse colon we know that the passage is from right to left, but we can never be certain of its position unless some pathological sign provides an indication. How is it possible then that we can hope to effect very much by massage of the abdomen unless it is by reflex effect ?

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Anyone, who has examined the abdomen of a patient who is suffering from sub-acute obstruction, must have been struck with the readiness with which a portion of the bowel will pass into spasm under the hand, in response to the gentlest of taps or the lightest of palpation. It is thus that we are able sometimes to assist in forming a diagnosis when, in response to the slightest stimulation, we witness the sign of visible peristalsis. Here then we have direct evidence of the reflex contraction of the unstriated muscle of the bowel in response to mechanical stimulation, and we see also one way in which we can assist the propulsion of the fluid contents of the bowel, viz., by stimulating peristalsis.

On the other hand, let those who hope to attain the same end by mechanical means witness the early stages of an operation for gastro-enterostomy. The surgeon draws up a portion of the jejunum, and, with the bowel actually in his hands, it is often a matter of difficulty to arrange for the passage of its contents so that he may have an empty piece of bowel on which to work. How much greater then must be the difficulty, if we can only handle that piece of bowel imperfectly through the abdominal wall! Moreover, if a patient is placed in the Trendelenberg position, the whole of the bowel (in response to the force exerted by gravity) flows into the upper part of the abdomen as if it were a fluid mass, save for the ascending and descending colons and the rectum. Surely then any pressure we may exert through the abdominal parietes will have a corresponding effect. The actual portion of bowel touched by the indented abdominal wall will contract before gliding away from the part pressed upon. How then can we by our massage exert a mechanical influence upon any given portion of the bowel if it is free to move? And, were we able to do so, how can we tell in what direction we wish to exert this influence, unless we are dealing with those very limited portions of bowel that remain permanently in a fixed position? In the other parts may we not be forcing the contents "against the stream" while endeavouring to assist?

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The uterus is the abdominal organ to which massage treatment is most frequently applied. The reflex response to mechanical stimulation of the unstriped uterine muscle is a well-known aid to parturition.

It is possible that other abdominal organs can be influenced by reflex, *e.g.* the unstriped muscle of the spleen may contract in response to mechanical stimulation transmitted from the ribs, or applied to the organ itself if it is enlarged. The function of the muscular tissue in the organ being to contract and relax, there is no doubt that stimulation to activity may be beneficial, but the physiological explanation of the benefit would be involved.

Professor Wide, of Stockholm, has shown by means of a blood-count, before and after treatment, that the number of red corpuscles in the blood is increased by abdominal massage. This, together with the general toning up of the vascular system, must re-act indirectly on all the abdominal organs.

The direct effect of massage on kidneys and liver will be dealt with when considering the mechanical effect of massage (p. 25).

The use of massage for stimulation of the heart is recognised in surgery, and it is performed in emergency by the "abdominal route." The hand is inserted into the upper part of the abdominal cavity, and the heart is then compressed between the diaphragm and the ribs. The vigour with which it is usually performed would encourage the supposition that purely mechanical action was anticipated, namely, that of pumping the blood from the heart into the great vessels. It may be necessary to render this assistance, but the effect of the massage would probably be no less gratifying were the pressure sufficient merely to render a mechanical stimulus to the unstriped muscle. If it is possible to stimulate into activity a heart that has actually stopped beating, it must be possible in the case of a heart that is already beating to enhance its activity by mechanical stimulation. The danger of flogging an overtired horse must, however, be kept in mind.

Whenever massage treatment is ordered, it is necessary

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to take the age of the patient into consideration, and more particularly when we are aiming solely to secure a reflex action. The reflex arc in the child is highly sensitive, and the fullest effect is thus secured rapidly. In the aged it is possible to cause fatigue with equal rapidity, and treatment then produces an irritative effect. In the young, therefore, and in the aged the duration of massage treatment should be short.

CHAPTER III.

GENERAL PRINCIPLES OF MASSAGE TREATMENT (*continued*).

2.—THE MECHANICAL ACTION OF MASSAGE.

To obtain a mechanical action, a heavier pressure is called for than that which we use if pure reflex action is desired. It would seem that there are four possible ways in which our massage movements can exert a mechanical effect :—

- (i.) By assisting the circulation.
- (ii.) By aiding the movement of the lymph.
- (iii.) By tension on some structure which we hope to free or stretch.
- (iv.) By the effect of pressure on the abdominal viscera.

(i.) *The Mechanical Effect of Massage on the Circulation.*

There are only two ways in which massage can produce a mechanical effect on the circulation. It may assist the venous return, or it may so act on the walls of the arterioles as to maintain or restore the tone of the vaso-motor system.

We know the results of mechanical stimulation of the unstripped muscle within the abdomen, and, arguing from these results, it seems not unlikely that restoration of tone, through the mechanical effect of massage on the circulation, is really due to a reflex response to mechanical stimulation of the unstripped musculature of the arterial system.

Direct mechanical assistance to the arterial supply of a limb by massage has, so far as I know, never been advocated.¹

¹ Recently I have seen centrifugal stroking of the femoral artery advocated for senile gangrene of the toes. The suggestion seemed so unworthy of consideration, and the argument so fallacious, that apparently I did not trouble to retain the article.

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If we desire to influence the vaso-motor mechanism, we can scarcely expect that purely mechanical agencies will effect our object, save in one or other of two distinct ways. By assisting the venous return we can lessen the *vis a fronte* in the arterioles, and the blood can then pass through them more rapidly. Thus, presuming the blood-pressure to remain unaltered, a larger supply of blood will be required for the part under treatment, and the vaso-motor mechanism must be called into play to fulfil this want.

It is also possible to cause a dilatation of the arterioles by paralysing their muscle fibres, much in the same way that we can note a paralytic dilatation as the result of an ordinary bruise. The only differences are that the paralytic distension caused by massage is (or should be) very transient, while that due to bruising is far less so; and that after bruising there is a certain amount of actual extravasation of blood. The pathology is the same, and the healthy glow seen on the surface of the skin after percussion is due to paralytic dilatation of the skin vessels (*cf.* p. 57). To the healthy person the effect of heavy percussion after violent exercise or a Turkish bath is undoubtedly pleasing, but its therapeutic value seems to be problematical. Any form of massage, with the exception of surface stroking, may be performed with rapidity and vigour if we wish to impart a general "refreshing" sensation. This treatment should only be administered to those parts which are nearly or quite normal and healthy—never over muscles that are paralysed or in neurasthenia—and only for a very few moments at a time over any given spot. Otherwise fatigue, either local or general, is inevitable.

If it is desired to cause a local hyperæmia, as is often the case, it would seem easier and safer to attain our end by some other means than by the use of massage, such for instance as the hot bath—be it air or water—or by some form of Bier's congestive treatment. Massage should be used to improve the circulation through the part treated. Contrast bathing where a limb is held

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alternately in very hot and cold water, is an excellent device for providing what Robert Jones has described as "gymnastics for the arterioles."

If we decide, therefore, that we will cease all attempts intentionally to secure mechanical effect on the vaso-motor system,—to a certain extent it is unavoidable in some of our manipulations,—it only remains to consider how our massage is to assist the venous return, leaving any vaso-motor effect to be achieved either by the result of our action on the venous return, or in response to reflex stimulation of nerve or muscle.

To assist the venous return there is no call for the expenditure of any great effort: the lightest touch is all that is required to empty the superficial veins of arm or leg. There is little reason for supposing that the pressure in the deeper veins exceeds 5 to 10 mm. of mercury, while in most of them it is lower still, the pressure in the veins at the root of the neck being negative.

Bearing in mind the effect of muscular contraction on the venous flow, it stands to reason that any attempt materially to assist the flow by massage is doomed to failure if the lumen of the vein has already been reduced to a minimum by muscular contraction around it. Thus our first law of treatment, if we are attempting to assist the venous flow, should be to ensure absolute relaxation of all muscles, not only in the part under treatment, but also throughout the various areas of the body that lie between the veins under treatment and the large veins in the region of the heart. If we are dealing with the veins of the leg, it is essential to see that all the thigh muscles are relaxed as well as those in the leg itself. Moreover, if the intra-abdominal pressure is raised by contraction of the abdominal muscles, there is a certain amount of obstruction to the flow of blood from the femoral vein into the external iliac vein; and it is therefore impossible to attain the maximum benefit from our massage of the leg unless the abdominal muscles are relaxed as well as those of the thigh. The effect of gravity should also be kept in mind, and so we

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find that, if we wish to do everything in our power to assist the return of blood from the foot, it is not sufficient that the patient should be seated with abdominal muscles relaxed, but he should be recumbent with thighs supported in a slightly flexed position. In this position gravity no longer opposes the venous flow, there is no increase of intra-abdominal tension due to muscular action, and the thigh muscles are relaxed.

If we examine a limb in which the muscles are completely relaxed, we find that it closely resembles a rubber hot-water bottle filled with water rather more fully than is usually the case. Thus the shape of the leg if at rest and in the horizontal position on a bed is, roughly speaking, oval with the long diameter transverse. If the heel only is supported by an assistant and the muscles are kept at rest, the oval shape remains, but the long diameter becomes vertical. In either case, assuming the muscles to be normal, voluntary contraction renders the contour roughly circular (see Figs. 1 to 4). In other words, the muscles, when in a state of relaxation, respond within the skin to the same laws that would control the position of fluid in a bag ; while if they are contracted they assume a consistency which is almost impervious to external pressure. We see then that, having secured perfect relaxation of the muscles, a very slight degree of pressure is all that is required to press the blood out of the part in contact with the hand into the next proximal portion. This truth is further borne out if we remember that it is possible almost entirely to deplete a limb of its venous blood by simple elevation.

If, on the other hand, we exert a considerable pressure in our movements, we shall empty the veins equally efficiently ; but there are other blood-vessels to consider. The pressure in the arterioles is very low and in the smaller arteries not very much higher. By the application of any considerable amount of pressure in a centripetal direction, it is obvious that we shall be forcing the blood in these slender vessels *against* the direction of the flow ; and it is difficult to argue from the purely scientific point

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of view that any benefit could result. Indeed, it is not inconceivable that we may be doing actual harm ; we



FIG. 1.—To show contour of the muscles, the lower limb being at rest and supported. Note that the long axis of the "oval" formed is transverse.

certainly cannot claim that by obstructing the flow of blood into the veins we are assisting the venous return,



FIG. 2.—The same as Fig. 1, the limb being supported only at the heel. The long axis of the "oval" becomes vertical.

which is the main objective in our manipulations. The clinical effect of too heavy pressure is a blanching of

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the part under treatment. There is no reason to suppose that the vaso-constriction is confined to the skin-



FIG. 3.—Contour with muscles contracted, the limb being supported only at the heel. The contour is more nearly circular than in Figs. 1 or 2.

vessels ; it must be presumed to take place in the deeper structures as well. Sometimes it is followed by a flushing of the part, due to subsequent vaso-dilatation, which



FIG. 4.—Contour with limb in same position as in Fig. 3, but with the calf supported. Note that the pressure on the calf now causes little or no change in the general outline of the limb, as the muscles are contracted.

if prolonged is probably paralytic. Anyone who has tested the blood-pressure in the brachial artery with an ordinary mercurial manometer, will know how slight a

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grip of the bulb is required completely to obliterate the brachial pulse. It is true that in massage we do not apply our pressure to the whole circumference of the limb, and therefore we are not likely to attain a similar result by an equal pressure, but let us beware of doing so even in the smaller vessels.

(ii.) *The Effect of Massage on the Lymphatics.*

All that has been said of massage as an agent to assist the vascular system, applies no less strongly when we consider its application for the benefit of the lymphatic circulation. Any toning up of the vaso-motor system that we can compass, and any assistance that we can give to the venous return, must, of necessity, tend to prevent the formation of œdema, and thus decrease any tendency there may be to stagnation in the lymphatics.

The pressure of lymph in the lymphatics is very low, and the lightest pressure must be all that is required to assist the onflow of the lymph under normal conditions.

But once œdema is present we have a pathological condition to combat, and it is well to remember that it is often possible to reduce an intense œdema by simple elevation. This reduction is, of course, transitory. Massage, even massage alone, can be invoked as a remedy calculated to secure permanent relief. It is also well to remember that œdema, as usually met with in cases recommended for massage treatment, is not due to disease of the lymphatic system, but is merely a symptom that "something has gone wrong" with the circulatory system.

Let us suppose that a rubber bottle filled completely by a sponge soaked in water is suspended by a string round its neck, and that we are asked to empty out the fluid content without disturbing the position of the bottle. The first thing we should do would be to take out the stopper and thus ensure there was no impediment to the outlet. Next we should place our hands on either side of the bottle near the top and squeeze out the water

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there ; on relaxing we should squeeze somewhat lower and empty out, as it were, the next layer, and so on. It would be obvious folly to try to achieve our task while the exit was blocked, and pressure from below (unless the bag were practically full of water) would only result in pushing the water from the bottom of the bag to the top, allowing it to drop back again as soon as our pressure was relaxed. The parallel between the sponge in a rubber bag and the lymphatic system is not exact, but will serve.

If we wish to reduce œdema in a portion of a limb the obvious course is to make sure there is no obstruction to the flow of the lymph in the proximal part. Let us then commence our massage above the level of the œdema and work gradually down towards the extremity—emptying a proximal space, filling it from the next more distal space, emptying it again, and so on.

Let us suppose that a leg is œdematous as high as the knee. Our first duty, as Wharton Hood has already expressed it, is to take the stopper out of the bottle by massage of the thigh. Then let us try to empty the contents of the lymphatics for, say, a hand's breadth below the knee into those above it, and we next ensure that the proximal channels are not overloaded by resuming massage of the thigh. Our next move is to restart massage of the leg another hand's breadth lower down. We empty this into the channels just below the knee, empty these in turn into the thigh, and once more see that these are not overloaded. In this way we can, by direct mechanical action, help to reduce œdema of the leg ; but several days might elapse before our massage of the foot commenced. Were we to treat the foot before the leg had been fully prepared, the only result would be that the lymph in the foot would be squeezed into the already over-distended channels of the leg, where its onward passage would be impeded, with the inevitable result that it would return to the foot on the first opportunity.

The following question sometimes arises :—“ Why, if the process of emptying the lymphatic spaces is all that is required, should the result obtained by massage be

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more permanent than that of simple elevation ? ” The answer is simple. By elevation we can reduce the swelling, but we are doing nothing to remedy the cause of the swelling. By the use of massage we can assist the action of gravity very materially, and, at the same time, we can secure restoration of the tone of the vaso-motor system.

In cases where the œdema is recent—however intense it may be—only a very gentle pressure need be exerted in our manipulations if the above plan of campaign is carried out faithfully. If the œdema is of long standing and of that tough, doughy consistency which the masseur so dreads to encounter, the exercise of a somewhat increased pressure may assist to clear the trouble more quickly, though our general plan should be adhered to in the main. Probably the pathological explanation of the need for this greater pressure is somewhat as follows. The lymph, owing to long stagnation, has partially clotted, and has assumed a consistency more or less resembling treacle—just as happens in the synovial fluid of a knee-joint that has suffered from a long-standing synovitis.

This thickened semi-solid lymph in the lymph spaces is too thick to pass through the minute stomata into the lymph channels. Our heavier massage is required to break up the fine meshwork that has formed in the “clotted” lymph and to render it less “treacly.”

It is possible that our pressure may have the effect of producing a temporary paralytic dilatation of the arterioles, which, by causing a further outpouring of lymph, helps to dilute the now “sticky” lymph already present to such an extent that it is once more able to pass through the stomata into the lymphatic channels. Needless to say, this is purely a theoretical speculation as to what takes place. If it is true, it is obvious that no great pressure is required to break up the minute and very fragile fibrils in the presumed “semi-clotted” lymph ; while the ease with which a transitory paralytic dilatation of the vascular system can be secured is shown by the readiness with which we can produce a flushing of the skin from this cause in response to very

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mild stimulation. But, be the true explanation what it may, it is certainly erroneous to suppose that severe pummelling of a limb is necessary for the reduction of œdema. Such treatment may, in fact, be detrimental. For the œdema to be present at all there must be some disorganisation of the vaso-motor system, and a severe handling may well inflict an injury which the deficient circulation is already inadequate to repair. The possibility of such injury is still more obvious when we remember that we may simultaneously be damaging the vascular system by forcing the blood along the smaller arteries against the direction of flow and at the same time—perhaps even by this very action—causing a prolonged paralytic dilatation of the arterioles.¹

(iii.) *Mechanical Effect of Massage in Stretching Tissue.*

There are two kinds of tissue, the result of pathological processes, which impede the restoration of function. These are white fibrous and yellow elastic connective tissue. Sometimes we are also called upon to stretch certain normal tissues which have become shortened owing to some pathological condition. The most common condition of this type is tendon-insufficiency.

With the bands of white fibrous connective tissue which require to be broken we have, or rather should have, little or nothing to do. They concern the surgeon only and should be broken down by him, preferably under an anæsthetic. But all adhesions do not partake of this nature: the yellow elastic adhesion can rarely be dealt with thus, and in massage treatment lies one chance of relief for the sufferer.

¹ Recently an officer who had been receiving massage treatment for many weeks came under my care. He tells me now that he laughed at the idea that our gentle handling could help him, when his former vigorous treatment had failed to do so. In a week he changed his mind on finding the circumference of his ankle reduced by over half-an-inch from the size it had maintained uniformly for many weeks. He added that he thought I was crazy when I first ordered massage to begin on the thigh when his trouble was in his foot!

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If we desire to make use of a spiral spring and it is a little too short for our purpose, the manner in which we should lengthen it is to pull the ends of our spring apart with a slow steady traction and then relax almost equally slowly to see how far our effort has met with success. Exactly in this manner should we deal with our yellow elastic tissue or with any normal structure which we desire to lengthen, for all tissues within the body, except bone, are elastic. Spasmodic slight tugs at the end of our spring would not serve to lengthen it ; sudden violent stress might tend to break it or so to modify its shape that it would be useless for our purpose. So with our elastic tissue, be it muscular, tendinous, or yellow fibrous. If we subject it to a series of spasmodic tugs, each tug will no doubt tend to lengthen it ; but, being elastic, the recoil will undo at once any good that may have been achieved. If, on the other hand, our movement is so violent that we succeed in breaking the offending structure wholly or in part, we shall thereby set up a reaction of such severity that all attempt at movement in the immediate future will be seriously impeded. The only safe treatment after this accident is to rest the part till recovery has taken place, when we shall find that the impediment of function is as bad as, and possibly worse than, it was before. This is, of course, only part of the truth, and refers to such stretching as can be performed in the massage-room. The surgeon in the operating theatre and under an anæsthetic may be able to break down even elastic fibrous tissue, but then he enforces a period of rest in the corrected position, preferably by the use of plaster of Paris applied firmly over exceedingly thick padding, until the reaction has passed off. Failing this, he will probably retard his patient's recovery no less than would the masseur had he attempted similar treatment. In fact, he often does so ; the whole question of " breaking down " is a matter of judgment, and error is unavoidable.

When a case is recommended for massage treatment and we find that our work is to stretch some impeding band or structure we may then be sure that what is

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required is slow, steady tension or some other form of gradual stretching, and take it for granted that, had forcible tearing or breaking down been desired, it would have been performed by the surgeon. We have only to decide upon the best method at our disposal to attain the end in view, and this we shall see, when we consider the treatment of scars and contractures, is to loosen the structures throughout the neighbourhood of the lesion, subsequently placing a gradually increasing tension on the offending structures, while an attempt is made to add slowly to that tension by means of manipulation.

Seeing, then, that the slow, steady pull is our chief remedial agent, it is evident that the longer this pull is exerted the greater will be the effect. The whole of the wonderful vista of the possibilities of splintage now opens before us. This much is certain: in suitable cases splintage will effect more stretching in a week than massage and manipulation can do in a month. It is also safer, being easily amenable to adjustment and comparatively free from the danger of excess.

In many cases of failure to effect a cure by massage, the true explanation lies in the fact that it has been asked to perform an impossible task. Where this is so there is a very grave danger that, legitimate treatment having failed—as fail it must—less legitimate methods may be attempted. Irremediable injury may be caused, and, in addition, massage has been abused.

(iv.) *The Mechanical Effect of Massage on the Abdominal Viscera.*

The reflex effect of massage in stimulating the activity of unstriated muscle has already been considered, but it is also possible to secure a definite mechanical effect in the treatment of the viscera by massage.

It has been mentioned that the dilated stomach can be made to contract by reflex in response to stimulation, but it will be found that the contraction of the stretched and therefore weakened muscles may by itself be inade-

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quate to empty the organ of its contents. The movement of these contents by mechanical methods, copying as far as may be the natural movement, undoubtedly assists their passage through the pylorus ; though even here reflex action must still play its part, as all the mechanical persuasion which we can exert with our massage will not induce the sphincter to relax.

As we have already seen, attempts to secure the passage of its contents along the small bowel by mechanical means would seem to be doomed to failure. It is impossible for us to know the direction of the passage of the contents in any particular coil under our hand, and, for all we know any pressure we may exert tends merely to force them "against the stream."

In the large bowel, on the other hand, there is a possibility of our being able to afford valuable assistance, though the instances where we can do so must be comparatively few when compared with the many in which we can help by securing reflex contraction. None the less it is undoubtedly possible to assist the passage of the contents downwards in the descending colon and upwards in the cæcum and ascending colon. The transverse colon is not so easy to manipulate, as its position is so variable. In rare cases, however, it is possible to note the presence of scybala or gas, and then our assistance to their onward passage may be most valuable.

The most common use of mechanical means for assisting the passage of the contents of a hollow viscus is, of course, in securing expulsion of the placenta ; but this hardly comes within the scope of massage.

Massage is also employed for the treatment of the solid viscera, and even the pancreas has been mentioned in this respect. It is probable that this organ can be influenced reflexly, but it would seem probable that it is only by the indirect effect produced by improving the general vascular tone. We may also be able to excite it to activity as the result of the passage of the contents of the stomach, which without our assistance might have been delayed.

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The effect of massage on the spleen has already been considered (p. 10).

Whether the action of the kidneys can be affected by massage is extremely problematical. During a cystoscopy urine may be seen to pass from the mouth of the ureter into the bladder in response to kneading of the kidney. Whether this result can be made use of for clinical purposes is more than doubtful, as a prolonged pummelling—sufficient to lead to the elimination of an appreciable quantity of urine—would, it is easy to imagine, be attended by serious risk of inflicting damage on so delicate an organ.

Much the same may be said of treatment administered to the liver. There is a common idea that anything that “shakes up the liver” is beneficial. The massage usually administered as a routine part of a “general abdominal treatment” should certainly achieve this end; but what the physiological result of this “shaking” may be it is not easy to judge. Certainly in the *post-mortem* room it is difficult to see in what respects “shaking up” would be beneficial, and examination of the liver-cells under the microscope seems to increase the difficulty. The assistance given to the portal circulation by our general abdominal massage may, and indeed must, have some effect on the circulation within the liver; and were it possible to knead the organ thoroughly we could doubtless aid the circulation within it still more. By assisting the circulation we can assist all the functions of the organ; and not only so, but we can probably reduce the viscosity of the bile and so render its excretion more easy. But that this effect, or indeed any other beneficial result, can follow as a direct result of percussion of the ribs seems more than doubtful. If it is attainable it is probably due to reflex *via* the intercostal nerves and the sympathetic system.

The gall-bladder, being a hollow organ, is amenable to the mechanical effects of massage. The very shaking up of the bile within it may have a beneficial effect, and doubtless its muscular fibres—though none too numerous

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—can be toned up and exercised. It is possible to imagine that we could actually aid the passage of the bile past the spiral valve in the neck of the bladder by our manipulations.

Of the organs within the thorax the lungs are, of course, amenable to mechanical treatment, as in the compression that forms part of artificial respiration. Though this is outside the realm of massage proper, much benefit may be derived by rendering mechanical assistance to respiration. The effect of massage on the heart is probably not a mechanical effect at all, but merely reflex,—the response of unstriped muscle to mechanical stimulation.

Massage is applied to the prostate for mechanical effect. By its means we endeavour to squeeze out undesirable *débris* in the ducts.

Massage of the ears can assist in allaying retraction of the drums.

CHAPTER IV.

THE MOVEMENTS OF MASSAGE.

I.—STROKING MESSAGE.

DESPITE the nomenclature that has been applied to the various movements of massage—*effrayante* Lucas-Championnière calls it—there are only three main varieties. These are :—

Stroking Massage,
Compression Massage,
Percussion Massage.

Each has countless subdivisions, all called by a different name ; and the classification by different authors is, unfortunately, not uniform. An attempt will now be made to reduce this classification to the simplest possible form, and to indicate the method of employment of each variety.

I.—STROKING MESSAGE.

This consists of the passage of the hand over a somewhat extended area of the patient's body. It has two varieties, superficial and deep.

(a) *Superficial Stroking Massage.*—Though it is possible to trace a reflex response to most of the movements of massage, this is the only movement which aims at securing no other effect.

The essentials to remember in using this treatment are that our movements must be slow, gentle, and rhythmical.

The slowness is important, as without it the other two essentials are impossible. If the stroke is to pass from hand to shoulder, some fifteen movements a minute will suffice. Moreover, the movement of the worker's hand must throughout be continuous and even, not only while

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the hand is in contact with the part, but also during its return through the air, when there must be no contact. Occasionally we hear it stated that loss of contact between the hand and the part is conducive to a chilling of the patient. This can only be due to inefficient performance, when the movement may convey a "creepy" sensation. This is usually the outcome of timidity, or of lack of training or practice.



FIG. 5.—Showing upward surface stroking of the lower extremity. In practice, in order to secure the fullest effect, the stroke should be continued up the thigh. Note that the "stroke" commences before the hand comes in contact with the limb, and also the slight flexion of the knee.

The call for gentleness is obvious, as we are avowedly attempting to secure no mechanical effect. The firmness of the pressure should be sufficient only to ensure that the patient is actually conscious of the passage of the hand throughout the entire movement. Thus there should be no question of the patient being able to detect the passage of the hand over a certain point during one movement while being unable to note it during subsequent movements. Otherwise the sensation conveyed by one move-

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ment cannot be identical with that conveyed by each subsequent movement. Firmness is essential, but only the lightest possible pressure.

The need for rhythm can be readily understood, as without it the nature of the stimulus will be uneven, and the reaction also will thereby be rendered uneven.

There should be no sensation of jarring at the beginning or end of the stroke, and the time that elapses between



FIG. 6.—Showing upward surface stroking of the lower extremity, the middle of the “stroke.” Note how the hand is adapting itself to the contour of the limb. There is no fear of the patient noticing any “scratching” or tickling sensation.

the end of one stroke and the commencement of the next must be identical throughout the whole of the treatment. To attain all these requisites it is essential to develop a “swing,” and the portion of the “swing” that takes place with the hand out of contact with the limb is as important as that during which hand and skin are in contact. Throughout the treatment the worker’s hand must remain supple, with all muscles relaxed, so that it may mould itself naturally to the contour of the limb, thus ensuring greater perfection of contact, and bringing

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as wide an area as possible under treatment (see Figs. 5, 6, 7).

The last point to consider is the direction of the stroke, when we are applying this form of massage to the limbs. Provided that the three essentials are carried out, this is a matter of minor importance. In his book on the treatment of fractures Lucas-Championnière inveighs heavily



FIG. 7.—Showing upward surface stroking of the lower extremity, the finish of the "stroke" just before contact between hand and skin ceases. Although reference is made to the "commencement" and the "finish" of the "stroke," it must be clearly understood that the "finish" represents equally well the "commencement" of the return of the hand through the air. As the movement is continuous, there can be no true "beginning" or "end."

against the use of any stroking in a direction opposed to that of the venous flow. But the context proves that he had in mind the so-called massage which is meted out after a Turkish bath, and surely it is impossible to imagine anything more devoid of scientific excuse than any form of heavy stroking against the venous return. But we are speaking now of the massage of skilled workers employed in the treatment of injury or disease, and of

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a movement that the French master referred to as "little more than a caress." If we wish to secure nothing but a reflex response to our movement, it may safely be left to the patient to decide the direction. If movement in one direction is more comforting than another, there can be no objection to using it, even though the movement be centrifugal. Surface stroking "against the grain" of a hairy limb may be devoid of comfort, and, if so, it cannot be expected to call forth a beneficent reflex. It can only annoy. Shaving the part might be expected to help, but it must be done so frequently that never a trace of opposition to the movement is encountered. Hence the process is not recommended as a routine.

But whatever may be the direction chosen, one rule must be strictly adhered to, namely, that the stroking is performed in that one direction only. Thus, if we are stroking the back of a patient suffering from insomnia, our stroke should be from cervical or thoracic region downwards, or to the cervical or thoracic region upwards, never from sacrum to thoracic region and then out over the shoulder with a downward tendency at the end. In the same way if a leg is being stroked upwards, the utmost care must be taken not to allow the hand to come into contact with any part of the limb during the return; otherwise the stimulus will be broken and the reaction thereby rendered imperfect.¹

It is often possible to secure reflex action in deep-seated structures as the result of superficial stroking, such as contraction of the stomach due to stimulating the left lower intercostal nerves, and stimulation of the rectum by stroking over the gluteal area. These will be dealt with subsequently, each in its separate place.

(b) *Deep Stroking Massage*.—This is usually referred to as *effleurage*, and should always be performed centri-

¹ Some people seem to be totally unable to learn the art of surface stroking. It is the simplest, but apparently the most difficult, of all the movements of massage. The discomfort to the patient of inefficient stroking must be experienced to be believed. The most common mistake is to scratch the patient with the pads of the fingers towards the end of each stroke.

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petally. The expressions "deep" and "forcible" are not synonymous, though the practice of many masseurs would lead one to suppose that they were so. The movement is intended to assist the restoration or maintenance of the tone of the vaso-motor system, to assist the venous flow and the circulation of the lymph, and, incidentally, thereby to improve the vascularity of the part and to hasten the elimination of waste products. It may be used to quicken mechanically the movements of the contents of some hollow viscus, or to secure some reflex response, such as an increase in peristaltic movement.

The resistance offered by muscular contraction to deep stroking is so great as to render it practically useless. Thus the first essential is to ensure that the whole part under treatment is in a state of perfect relaxation. This entails careful attention to the postural position not only of the part under treatment but of the patient's whole body. If necessary, relaxation must be procured by preliminary superficial stroking. If the muscles are relaxed, they offer no more resistance to the movement than so much fluid and therefore it is obvious that any pressure, exerted on the surface, will be transmitted freely to all the structures under the hand. To attain any of the objects in view in using the movement, except perhaps the mechanical emptying of a dilated stomach, a pressure of 10 mm. of mercury will suffice. A little practice, combined with a skill that is born only of a sensitive sense of touch, will show how delicate may be the pressure which will suffice to compress any structure to its full extent, and therefore, incidentally, to empty the veins and lymphatic spaces. Also there is no call for great rapidity of movement. The flow of blood in the veins is slow, and of the lymph in its channels still slower. There is no object in performing a movement to empty a vein if sufficient time has not elapsed for blood to flow into it since the last movement ceased. Moreover, a heavy pressure, a very rapid movement, or even a jarring contact may convey to the patient the fear of a possible chance of injury, be the fear conscious or sub-conscious. A protective reflex may then be estab-

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lished, the muscles may contract, and the one condition under which we can perform our work to the greatest advantage thereby be demolished. If we are fortunate

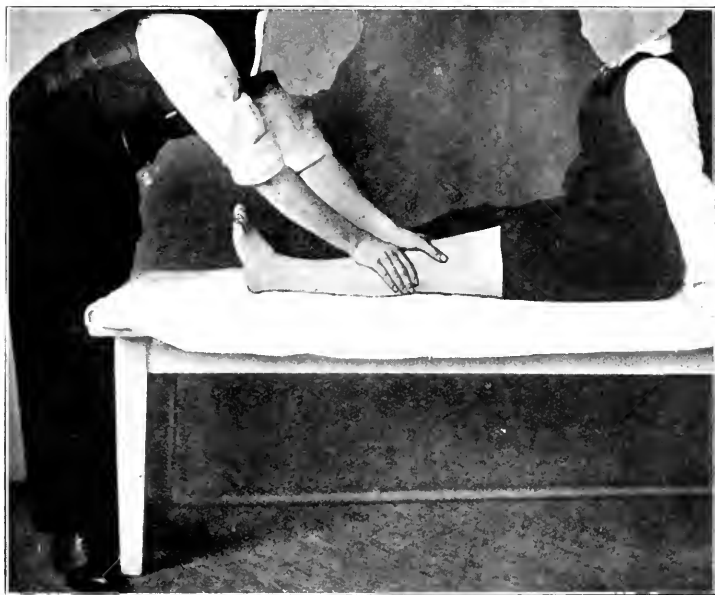


FIG. 8.—Upward stroking of the lower extremity to illustrate some common faults in position :—

(A) *Of the patient.*

- (i.) General discomfort, head unsupported, abdominal muscles contracted.
- (ii.) Knee fully extended, thigh muscles tense.
- (iii.) Foot unsupported.

(B) *Of the masseur.*

- (i.) General discomfort, great strain on back muscles and on knees.
- (ii.) Inability to reach whole of limb.
- (iii.) Inability to render support to limb.
- (iv.) Regularity of movement or pressure quite uncontrolled.

enough to escape this sequel, we shall run the danger of forcing the arterial blood against the stream, unless we keep the pressure we exert within moderate bounds.

Unless contra-indications exist, we may take it for granted that deep stroking should commence over the

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proximal segment of a limb before we attack the distal, so as to ensure the "removal of the cork from the bottle."

In performing all stroking movements the points that require most attention are the position of the patient and of the worker and the relative position of one to the other. Especially is this the case in the treatment of the limbs. An attempt has been made in Fig. 8 to illustrate common faults in position of the patient and masseur. It will be noted in illustrations 5, 6, and 7, that, contrary to the teaching of some schools, the masseur works from the side of the patient instead of from the end of the outstretched limb. This enables him to ensure an evenness in his work which is well-nigh impossible in the "faulty position." The other point which will be noted, as being at variance with the procedure sometimes advocated, is that the ulnar border of the hand is allowed to lead the movement as freely as the radial border. By this means it is often possible to secure a greater amount of regularity both of pressure and movement.

Deep-stroking massage is frequently applied to the abdomen. It stimulates peristalsis by the reflex response of the unstriated muscle to mechanical stimulation, and may help to move the contents of one piece of bowel into that next adjacent. In treating the cæcum and the ascending and descending colons, this movement may be used with great benefit; but we must remember that, to attain the greatest benefit, the same rule must be observed which we saw was essential in the treatment of œdema, namely, to ensure that the "cork is out of the bottle" before we try to empty it. Thus if we wish to empty the cæcum the place to commence our stroking is over the descending colon, then over the transverse colon (if we know where to find it), and finally over the ascending colon before the area of the cæcum is attacked. Let us remember, however, how great is the difficulty experienced when we try to empty a piece of bowel of its fluid contents by mechanical means.

It is possible also—the claim is usually definitely made but without explanation to justify it—that by our massage

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we are able to promote glandular activity in the bowel. The increased peristalsis will undoubtedly assist us directly, and will also aid indirectly by demanding an increased blood supply. At the same time our massage is assisting the abdominal circulation and aids the onward passage of lymph and chyle. Doubtless the improvement in circulation will materially assist the glandular activity. It is, however, a secondary and not a primary effect.

CHAPTER V.

THE MOVEMENTS OF MASSAGE (*continued*).

2.—COMPRESSION MASSAGE.

THIS is used if we wish to exert local pressure at any definite point, and is usually applied to a series of points.

The movements fall under three heads :—

- (a) *Kneading*.
- (b) *Friction*.
- (c) *Pétrissage*.

A considerable amount of confusion exists as to the definition of the exact movements that should be comprised under each head. The fact is that the movements so closely resemble one another that it may be almost impossible to differentiate between kneading and the picking-up movements of *pétrissage*. From the clinical point of view the line of demarcation appears to be purely arbitrary, as there can be little or no difference in therapeutic effect (provided the part is relaxed) between, say, pressing the superficial flexors of the forearm upon the deep flexors (usually called *kneading*) and picking up the whole muscle group in the hand as far as possible and gently squeezing it (*pétrissage*). The first is a vertical compression of the tissues as compared with the lateral compression of the second. Then, again, friction is a term often wrongly applied to the administration of a purely local pressure given with, say, the tips of the fingers, while kneading is the term applied if the pressure is to be exerted with the whole surface of the hand. "Kneading" is a term which should be confined solely to movements which aim at securing circulatory effect, while "friction" should be held to indicate that the movement is of small amplitude and aims at dispersing

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the products of pathological change, whether due to past trauma or to chronic disease. Occasionally it is used with other objectives, as will be explained later. There are, however, definite points in the mechanical performance of the movements that serve to differentiate them, even though the division between them is arbitrary and the difference of therapeutic effect more imaginary than real.

To be effective, absolute relaxation is essential throughout the performance of the movements. As in the case of *effleurage*, the attainment of this essential *desideratum* can be rendered impossible, if the movements are carried out with sufficient vigour to call forth a protective reflex contraction of the muscles. Thus care and gentleness are the key to success: vigour, excessive rapidity, and undue pressure are all inimical. Repetition may serve to emphasise the fact that in relaxation the tissues of the body respond to pressure as would fluid in a bag, and that very slight pressure suffices to empty veins and lymphatics, while any heavier pressure may force the arterial blood against the stream.

(a) KNEADING may be applied to the limbs, the back, and the abdomen. It is usually described as a deep movement, but some authors prefer to describe it as "superficial" to distinguish it from the "deep" movement of friction. If perfect relaxation is present, the pressure in either instance must, by all the laws of hydrostatics, be transmitted throughout the segment of the limb under treatment, and the movement hardly less so. Thus the distinction between "superficial" and "deep" is unimportant.

(i.) *Kneading of the limbs* is performed with the two hands placed on opposite sides of the limb, the whole of the palmar surfaces being in contact with the part. Gentle pressure is then exerted and a circular movement performed, the hands usually working in opposite directions. Deeper kneading is performed in a similar manner for chronic cases with infiltration of the tissues. The pressure is so regulated that it is not even throughout

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the movement, but should be greatest while the hand is engaged with the lowest part of the circumference of



FIG. 9.—Kneading. First position.

the circle, and least when at the opposite pole. This is effected by imparting a slight rotation to the wrist, the



FIG. 10.—Kneading. Second position. Note the relative pronation. The rotation is exaggerated for purposes of reproduction.

hand being more supinated below than above (see Figs. 9 and 10). In this way we can imagine that a sort of pump-

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ing action is exerted on the fluid contents of the limb. The movement commences over the proximal portion of the limb ; the pressure is then re-applied at the next most distal part and the movement repeated. The two portions are then stroked firmly, or perhaps the first is again kneaded before a third more distal part is treated. It is sometimes said that the idea of the movement is to roll the superficial structures on the deep—in fact the movement is sometimes referred to as “rolling.” In perfect relaxation the soft tissues might be “rolled” on the bone ; but, as this is usually undesirable and to be avoided with care, the action produced should be rather that of a wave-like motion throughout the limb. The point (or rather pair of points) from which the wave is transmitted is fixed, as distinct from the movable point when the wave is set in motion by deep stroking.

The objectives in view when kneading a muscle mass may be many, and amongst them are the following :—To assist nutrition by reflex and mechanical effect on the vaso-motor system, and so to influence every structure in the limb ; to assist the flow of lymph and hasten the removal of œdema ; to bring a sense of comfort and well-being to the muscles and thus render them the more ready to perform exercises ; and, after exercise, to prepare the way for greater or more prolonged effort, by hastening the removal of waste-products. By excessive kneading it is possible to produce in a wasted muscle all the symptoms of acute fatigue. The movement also can be used to aid in the stretching of pathological shortening of soft tissues and of adhesions, and is of great service in resolving any general matting together of soft tissues.

(ii.) *On the back* kneading is performed in a similar manner, working from below upwards, so as to impart to each portion of the muscle-mass an alternating wave of compression and relaxation. A lateralisation movement is also imparted. Unless it is desired to loosen anything in the form of adhesions or to disperse pathological deposits, the kneading movement so often applied

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to the erector spinae has no scientific excuse. It aims, apparently, at forcing the blood in one direction with one hand and in the opposite direction with the other. It is quite easy to obtain the lateralisation effect with deep stroking, and, by using this instead, the flow of fluid in the tissues is maintained in one direction.

(iii.) *Kneading of the abdomen* will be dealt with in a subsequent chapter. Here it suffices to say that a common type of description of this movement is somewhat as follows. Kneading consists (*a*) of making alternate pressure first with the heel of the hand and then with the fingers—a sort of see-saw movement; (*b*) of circular kneading by pressure with the radial border of the hand, tips of the fingers, and ulnar border in turn; or (*c*) of kneading the colon with the palmar surface of the fingers on the ascending colon, rolling the hand over so that the ulnar border presses on the supposed position of the transverse colon, while the ball of the thumb finishes up the movement along the descending colon. A description of this type simply ignores the fact that abdominal massage treatment should be performed not solely to hasten the passage of the abdominal contents, but also with many other objectives. Moreover, the *raison d'être* of the first two movements is not very plain. The see-saw movement might be performed over a piece of small bowel so as to exert pressure in the opposite direction to the flow of its contents, while the second is almost certain to do so at some points. The last movement would probably be better performed by plain stroking and intermittent pressure over one spot. If the idea of performing the movement as described is that any of the contents of the cæcum are thereby pushed into the ascending colon and thence *via* the two flexures and transverse colon into the descending, the sooner it is abandoned as hopeless the better. Were we actually to perform such a feat, the chances are we should be able to produce an involuntary evacuation of the bowels by a mere movement of the hand!

Any of the movements mentioned will, however, have

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the effect that the part of the bowel pressed upon will respond by the contraction of the unstriated muscle to the mechanical stimulus. Care must be taken, however, to ensure that the pressure is not sufficient to tend to paralyse the part pressed upon, in the same way that paralytic vaso-dilatation can be inflicted by the too vigorous massage of a limb.

(b) FRICTION.—In using friction the object in view is to press deeply on the part under treatment and then to move the hand in a more or less circular direction. Any part of the hand may be used, but that generally employed is the tips of the fingers, or tip or ball of the thumb.

It is usual to recommend that the movement should be performed with the elbows straight so that the whole weight of the body may be thrown into the movement.

This instruction is open to great misconception. It would seem that it is often interpreted as implying that the masseur is to throw all the force that is possible into the movement. He therefore holds his breath and stiffens every muscle in the body in his attempt to secure the utmost limit of pressure. All that is needed to correct the misconception is to add to the instruction that the hand must be maintained supple with its muscles relaxed, that no muscle should be kept in a state of fixed contraction, and that the worker should breathe freely and easily throughout the movement. By rhythmical swaying of the trunk through a small amplitude an alternating compression and relaxation can be produced. The amount of pressure exerted can be regulated to a nicety, and by slowly progressive increase in pressure (provided the rhythm is slow and unbroken) no protective reflex will be excited, and far greater depth can be attained than by the exercise of any amount of force. Should any error of technique, such as injudicious haste, give rise to protective or other reflex, the movement should be discontinued until relaxation has again been secured—probably by the means of stroking. So widely does the misconception of the use of the body-weight in massage

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seem to exist, that it is necessary to emphasise the fact that force should find no place in treatment. Pressure, when exerted, should invariably be light at first and steadily progressive, the increase depending solely on the conditions present. When commencing treatment it is always a wise precaution to treat the patient as if he were suffering from a far more serious ailment than is actually present.

If we are able to attend to a patient, who has suffered a recent injury, so quickly that subcutaneous hæmorrhage may still be in progress, it is most desirable that sufficient pressure be exerted forthwith to prevent any further effusion of blood; and, before it has had time to begin to organise, to disperse such blood as may have already escaped from the torn vessels. The area must be small, or the injury will be too severe to treat immediately in this manner with any hope of success. If, however, opportunity is afforded, friction with the ball of the thumb forms an ideal method of treatment. The distinction between "friction" of this type and some movements already described as "kneading" is negligible.

In sum, then, all that has been said in dealing with the forms of massage already considered, holds good for friction. There is no call for the exercise of great strength or excessive pressure, and either of these may secure one or more of the detrimental results suggested elsewhere as being possible.

Friction is usually advocated to aid the absorption of local effusion and to break up the results of inflammatory processes. The latter term is in massage *parlance* frequently used in a somewhat loose sense, owing, it can only be supposed, to a lack of efficient training. Every massage worker should be made to understand—mere verbal instruction is inadequate—how to distinguish between the "inflammation" of the ordinary physiological processes of repair after injury, the true inflammation due to sepsis, and that of sub-acute or chronic conditions which lead to the formation of pathological deposits. It is well to emphasise this distinction, as it is quite common

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to find that it is not clear in the minds of some masseurs. The result is that many a quiescent septic focus has been recalled into full activity by over-zealous endeavours by deep friction "to break up the inflammatory products" following a compound injury. In all places where massage work is being done for the wounded this danger cannot be over-emphasised. If friction is applied to a limb in which the muscles are relaxed there can be no necessity for the use of heavy pressure.

Friction is also advocated for treatment of the colon :



FIG. 11.—Friction of the iliac colon. Note that every care is taken to ensure that the abdominal muscles are relaxed, and, a point of distinction between this and other movements, that the interphalangeal joints are kept fully extended. It is preferable that the masseur should stand on the left side of his patient. He is shown here on the right owing to the difficulty of reproduction.

let us beware of the possible danger of paralysing the unstriped muscle which we wish only to stimulate (see Fig. 11).

Much has been written about nerve frictions, in which the pads of the fingers or thumb are placed on either side of the nerve and the circular movement imparted as the hand slowly ascends along the course of the nerve. Static nerve frictions are given by applying the movement to one or more specially selected points on the course of the nerve. One cannot suppose that any benefit can be derived by the axon, which is dependent for its vitality

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on the integrity of the nerve-cell from which it arises. This is so far removed from the site of our massage operations that our hope of securing any effect upon it is problematical in the extreme. That sufficient pressure can cause a solution in continuity we know : a lighter pressure will only have the effect of irritating, and less pressure still will probably have no effect at all. The result of friction on the neurilemma is a matter for speculation ; it is difficult to explain any beneficial action, but easy to imagine the possibility of injury from excess. There remains the sheath. It has its own blood supply—the *come; nervi communicans*—and this is doubtless open to the influence of massage no less than other small blood-vessels. The lymph spaces in and around the sheath can be influenced in similar manner, and we know that in certain ailments pathological products are to be found in the sheaths of nerves. Under these conditions nerve frictions find their *métier*; and, should the deposits have been a cause of irritation, it is easy to understand that, by their removal, the neurilemma and axon are deprived of a definite source of danger and irritation. We know also that one cause of persistent and chronic neuralgia is the presence of minute adhesions which pull or press upon the nerve. It is possible to secure relief in specially selected cases by frictions.

Nerve frictions should have a strictly limited use, and in all cases should be commenced tentatively. They should never be given in any acute condition, but only where the latter has subsided and active inflammation has ceased. The products of inflammation left deposited in the sheath may then be dealt with by frictions. Nerve frictions should never be administered unless specially prescribed or permitted by the medical man in charge of the case. Their promiscuous use may prove to be a fertile source of injury. It would be hard to produce physiological reasons in justification of nerve frictions in any case where the trouble is due to failure of the nerve-cell or its axon. A general working law may be formulated thus :—Nerve frictions are safe if pain is not

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increased. Little good can be expected from them if the nerve-cell or its axon is diseased or injured. Absorption of pathological products may be hastened, and adhesions stretched, provided a careful watch is kept, and treatment ceases the moment danger signals arise—the chief being the onset or increase of pain.

(c) PÉTRISSAGE.—*Pétrissage* and kneading are so similar in effect that distinction between the two is uncalled for. The term is usually applied to a movement that consists of “picking up,” as it were, the tissues and submitting them to intermittent pressure. The technique varies slightly in different parts of the body.

It is used for the treatment of the skin and subcutaneous tissues, and serves a very useful purpose when we try to revitalise a dry, scaly skin which has lost its nutrition as a result of long splintage with, or sometimes without, sepsis. To attain this end it usually suffices to pick up the skin and subcutaneous tissues between fingers and thumb and to submit them to a gentle rolling movement. Not only are the tissues rolled between the digits, but the portion so grasped is slid about on the tissues immediately underlying them. The muscles should therefore be held in a state of contraction. Both hands usually work together. No great pressure is called for, only enough, in fact, to ensure the raising up of the flesh between the manipulating fingers.

For the reduction of adipose tissue, on the other hand, a soft though firm grip is required. A considerable amount of energy may be expended, as now we are attempting by our massage to perform a feat which must amount to little less than the emulsifying of the fat in the connective-tissue cells, so that the fat globules may escape into the lymphatic system and be carried away from the part under treatment. It is possible that some of the fat may be “burnt up” by the local increase in temperature due to the local hyperæmia in the part manipulated. In treating this condition the fingers may be allowed to glide over the surface while the pressure is being gradually increased. The movement is not comfortable, but any

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pain which may be caused should be instantly relieved by a little gentle stroking.

Otherwise the movement of picking up is reserved for the treatment of muscle tissue and for the stretching of adhesions and scar tissue, whether these consist of definite bands or of a general matting together of the tissues.

The movement consists of grasping the muscle mass between the fingers and thumb of both hands and raising



FIG. 12.—To illustrate “picking up” of the calf-muscles. The flexion of knee combined with plantar flexion of ankle ensures relaxation. Adequate lateral support for the knee is essential in this position. If the worker stands at the end of the bed, the foot should rest with its plantar surface upon it, the knee being flexed to nearly a right angle. (Cf. Fig. 15, p. 61.)

it away from the subjacent tissues. The tissues grasped are then compressed alternately between the thumb of one hand and the fingers of the other. The hands are made to slide gently over the surface till the whole region has been manipulated. Care should be taken to avoid an all too common error in technique, namely, the dragging of the fingers over the surface as if treating adipose tissue, instead of merely exerting an intermittent pressure. The grip should be soft, the whole hand relaxed. Sometimes, when the muscular tissue is sufficiently bulky,

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each picking-up movement is made to alternate with a kneading movement.

A third method, applicable chiefly to the calf, is performed by picking up the muscle in one or both hands and carrying it from side to side with an inclination to upward movement at the same time. The result is almost a semi-circular movement (see Fig. 12).

It will be seen that the last method of performing the movement amounts to little more than grasping a muscle group and shaking it. The same effect can be attained by kneading, by rapid deep stroking, or indeed by almost any manœuvre of massage. By them all—provided there is complete relaxation—any soft tissue can be submitted to a “shaking-up” process, the severity of which must depend on the condition we are trying to remedy.

All that has been said under the heading of “kneading” applies with equal force to the picking-up movement, but it is well to emphasise the two cardinal points: first, that absolute relaxation is essential; and, second, that, given relaxation, no force or vigour is required to attain the fullest possible benefit. Any movement that calls forth a protective contraction can only defeat our aims, and should be regarded as an error in technique.

CHAPTER VI.

THE MOVEMENTS OF MASSAGE (*continued*).

3.—PERCUSSION MASSAGE.

THIS consists of administering a series of blows to the part under treatment, the two hands working alternately. It is commonly known as *tapôtement*. The movements usually described are :—

(a) HACKING.—This may be performed with the ulnar border of the little finger, either alone or supplemented in

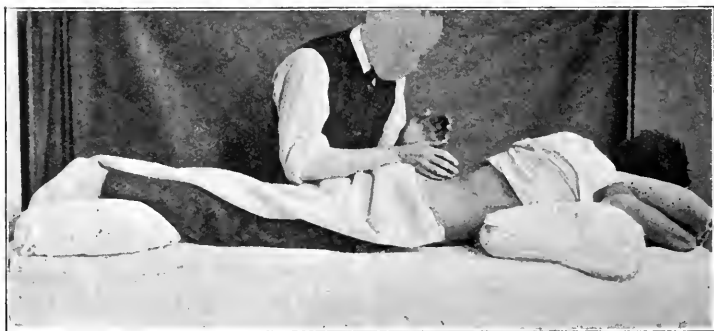


FIG. 13.—Hacking. Mildest form. Note wrist action and position of the fingers.

turn by the other fingers—the result being a series of soft blows, the first from the little finger direct, the others from each successive finger in turn transmitted through the finger or fingers that have already delivered their tap (see Fig. 13). Sometimes the little finger is curled up in the palm of the hand, and only the middle fingers are utilised. If a more vigorous action is deemed necessary, the ulnar surface of the whole hand may be used with all the fingers kept close together and contracted but not rigid. The tips or palmar surfaces of the three middle fingers can be utilised ; and

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a complicated movement called "*tapôtement à l'air comprimé*" has been devised in which the palm is kept concave with the phalanges fully extended until the moment the hand is about to come in contact with the body, when the whole surface of the palm of the hand and fingers is rendered suddenly convex, the fingers being opened and extended. The movement is performed from shoulder, elbow, and wrist combined. It is only used in heart treatment : its value is speculative.

(b) CLAPPING.—The hands are held so that the fingers and palm form a concave arch, and in this position they

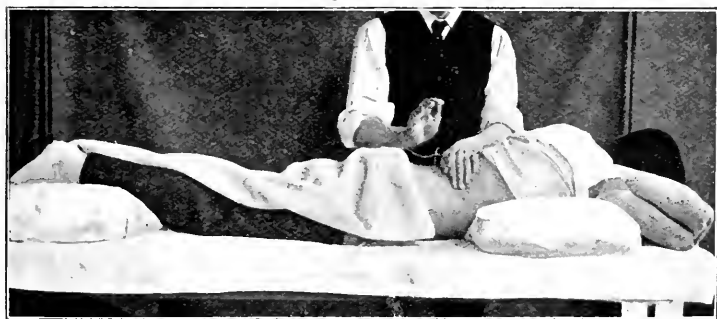


FIG. 14.—Clapping. Note the wrist action and the manner in which the pillows are arranged for the comfort of the patient.

are brought sharply into contact with the body. The result is a rather deep-toned clapping sound. Applied to the chest, it probably aids the interchange of gases, stirs up the residual air, and assists in the loosening of mucus. This movement, like hacking, should be performed chiefly from the wrists (see Fig. 14).

Ordinary hacking is used over the chest in the treatment of heart cases, but requires great care. Its action on the heart (if any) is probably due to reflex, but, if vigorously performed, it might act directly on the heart muscle. The effect on the lungs is similar to that of clapping. Over the abdomen the application of hacking or clapping assists to tone up the abdominal muscles through the agency of the abdominal reflex, and can stimulate

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peristalsis by the mechanical stimulation of the unstriated muscle of the bowel. These movements should rarely, if ever, be used on the abdomen. If used, the performance must be very gentle.

Some students are actually taught to perform the hacking movement against the sharp edge of a marble mantelpiece. This may be a wise precaution when the individual attention given during training is inadequate to ensure the development of a satisfactory technique.

When efficiently performed the application of these movements is most pleasing and refreshing. For this reason it is sometimes a good plan to use either clapping or hacking as part of the treatment to be given between the performances of various exercises; but almost any other form of massage serves at least equally well.

(c) BEATING.—This is the most vigorous form of percussion massage. The fist is half closed, and either the ulnar or the palmar surface is used for beating the surface of the body. If no force is put into the movement, it may be used over bony areas, such as the sacrum, and over areas well covered by muscle, such as the gluteal region. As our only hope from its use in these regions is to secure a reflex action, it should be performed lightly. Used over the ribs, it helps to “shake up the liver,” and serves generally as the most vigorous form of massage. The knuckles of the clenched fist may be used vigorously if a purely moral effect is desired. In the case of a malingerer in a military hospital the energetic performance of this movement in the presence of the other occupants of the ward may work a rapid cure. It should, of course, be applied by the surgeon in charge, and then only if his diagnosis is incontestably correct.

It is usually stated that percussion massage produces its best effect if the muscles of the part are maintained in a state of contraction, and some workers appear to believe that this movement can strengthen the muscles. We know that muscle will respond by contraction to mechanical stimuli under suitable conditions, and it is thus that we witness the phenomena known as tendon reflexes. But

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we know equally well that one of the tests for severe nerve-lesion is the attempt to elicit contraction of certain voluntary muscles in response to direct mechanical stimulation. Unless the stimulation is sufficient to call forth a protective or irritative reflex contraction, the normal muscle will not respond by contraction to mechanical stimulation. Thus we cannot expect that healthy muscle will contract in response to any form of percussion massage that is administered with a mildness that is not sufficient to elicit one of these reflexes. There is one exception. The abdominal muscles will respond, but only on account of the ordinary abdominal reflex, which, in itself, is probably protective. Similarly the plantar and cremasteric reflexes can be excited by any form of percussion massage. It should be noted that it is essential to avoid touching the inner surface of the upper part of the thigh during the administration of any form of massage treatment, unless it is the site of actual injury.

If the healthy muscle will not respond, far less will a paralysed muscle do so ; and, if we are dealing with a case of paralysis, it is obviously impossible that our first law in using percussion can be respected, namely, that the muscles must be maintained by the patient in a state of contraction. It should, therefore, be abolished from all treatment for the paralysed until such a time as voluntary contraction has not only been restored, but has been sufficiently restored for the patient to be able to maintain it throughout treatment. If the paralysis is of the postural variety, gentle percussion may be used when recovery is progressing and the effects of the pressure are passing off. The promiscuous use of the movement so often encountered, regardless of conditions present, indicates once more lack of adequate teaching and training, and constitutes a gross error of technique.

When, however, muscular tone is present but deficient, it can without doubt be improved by percussion massage ; but the restoration is so poor compared with that following the use of electrical stimulation that it is little better than waste of time, if a battery is available.

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If the muscles are allowed to remain relaxed, the effect will be a more or less general "shake up." This will be obvious if we remember that a limb in which the muscles are relaxed compares not unfavourably with a rather well-filled rubber hot-water bottle.

Spinal back hacking induces a sense of warmth and invigoration, and is often of service if a patient has become "chilly" from any cause.

The percussion movements are described as "stimulating," and as such are frequently recommended for neurasthenia, owing, apparently, to the confusion that exists in some minds between neurasthenia and hysteria. It would be hard to find the neurasthenic who would prescribe them for a fellow-sufferer. For such they constitute a refined method of torture. In the very late stages of convalescence they might find a place, but other methods of treatment are even then to be preferred.

If used over the reflex areas, such as the gluteal region, over the great sciatic notch, or over the left lower ribs, it is possible at times to secure by percussion a marked reflex contraction of the lower bowel or of the stomach. No attempt should be made to do so in young people, especially boys.

The skin vessels contract at first in response to the movement, but there is usually a subsequent dilatation which remains for a length of time entirely proportionate to the vigour of the treatment. It is thus possible to produce a flushing of the skin.

The nerve-endings are of course stimulated by the movement, but, if it is prolonged or vigorous, an almost complete numbing effect can be produced. It is not beneficial, however, as it is due to sheer fatigue from over-stimulation; and as the fatigue passes off irritability follows.

Percussion over the ribs is performed with the idea of stimulating the liver, but whether the action in this respect is real or imaginary is a matter for speculation. By its means we can undoubtedly "shake up the liver,"

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and it is possible this may assist the flow of bile. The question has been more fully dealt with elsewhere.

Percussion over the sacrum is of assistance in atony of the bladder or rectum.

Percussion should be prohibited over any muscle that is abnormally contracted, over any sensitive area, over any paralysed muscle until its contractility has been restored, or in neurasthenia during any but its latest stages, and probably even then.

It will be surmised from the above account, and from the frequent advocacy during the preceding pages of gentleness, that the author is anxious to impress the essential desirability of exercising care and gentleness throughout all massage treatment, and not only when dealing with acute cases. During a six months' training in which there is so much to be learnt, and during which clinical experience cannot be other than limited, it is impossible to give adequate instruction for the treatment of every class of case that may be encountered, or to indicate how different may be the treatment that should be given to two apparently similar cases when due regard is paid to all the circumstances.

Every case that is recommended for massage treatment invariably presents some one or more structures in which the general vitality is lowered, and, having been taught that certain massage movements are "stimulating," the worker (not unnaturally) forthwith applies them. Ask that worker *why* he does so, and the only answer we get is: "I thought the part required stimulating." Inquire further *what* he is trying to stimulate, *how* the movement he is performing is calculated to attain his end, or even perhaps *why* he thinks stimulation will prove beneficial, and it is rare to receive any satisfactory reply. It is necessary, therefore, to consider exactly what is meant by the word "stimulating" in its application to massage, and to utter a word of warning as to the dangers of overstimulation.

In routine medical and surgical work the efforts of the physician or surgeon are frequently confined, in the first

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instance, to ensuring relief for the patient, and sedatives frequently replace stimulants with remarkably beneficent effect.

Thus, considering "accident cases" as a whole, it is safe to say the patients will suffer to a greater or less degree from shock to the central nervous system, and that this element in the case is by no means negligible. Often enough it is overlooked, but it should be the surgeon's first care to reduce the effect of shock to a minimum. After fracture the intense spasm of all the muscles which control the movements of a limb is a source of most acute physical suffering, which greatly augments the general "shock."

Few of those who practise massage have the opportunity of realising how profound may be the "general" effect of such purely "local" suffering. Yet it is the daily experience of every surgeon to note the rapid general improvement of all—save only the most severe—"accident cases" the moment the patient is placed under the influence of an anæsthetic. This improvement is due essentially to the complete sedative effect. If ether is given it acts as a powerful cardiac stimulant in addition; but the primary cause of the improvement is relief from the perpetuation, as it were, of the shock. This can be proved by watching the progress of a case of a severe comminuted fracture of the hip when amputation is performed. The patient arrives in the theatre, apparently moribund. The seriousness of his condition is the result of shock, since there may have been but little loss of blood and sepsis has had no time to play its part. Improvement is noticed directly anæsthesia has been induced, the heart-beat becomes slower and stronger, the pulse increases in volume and tension, while the colour improves and the cold, clammy sweating ceases. Moreover, the improvement is continuous, in spite, it may be, of the infliction of further "injury" by the surgeon, simply because the torn and otherwise damaged tissues—especially nerves and skin—can no longer send up their inimical impulses to the cord and brain from the mangled site of injury.

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After the anæsthetic, saline may be given—perhaps alone, perhaps with stimulant in the form of brandy, pituitary extract, adrenalin or ergot, or perhaps with food in the form of dextrose. All these help to tide over the immediate emergency ; but last, to minimise the shock as much as possible, most surgeons rely on morphia. The whole of Crile's theory of anoci-association is based on the prevention of stimuli reaching the brain from the site of operation, or, in other words, the prevention of shock due to local injury.

If surgeons, then, note and utilise the beneficial effect of sedatives—and note also the too frequent inimical effect of stimulants, such as strychnine—in the treatment of the result of injury upon the central nervous system, the masseur should follow suit, no matter what the cause of the injury may be, whether physical or psychical.

Again, consider the patient with advanced heart disease who is rapidly failing. A small dose of heroin will often produce a markedly beneficial effect when every stimulant in the pharmacopœia has been tried and found wanting. The masseur should, therefore, try equally to soothe the voluntary muscle when “fagged out,” not to stimulate it.

If we consider the action of a “stimulating” electrical current on the ordinary muscle-nerve preparation from a frog, the first effect we notice is contraction of the muscle. Surprisingly soon, however, we note the signs of fatigue. When this has advanced so far that the muscle fails to respond, response can still be elicited by application of the electrode direct to the muscle. This indicates that the fatigue is in the nerve—not in the muscle. In using the movements of massage as a means of stimulation we must remember that fatigue and stimulation go hand in hand. Moreover, no muscular response will be obtained from massage unless we are treating a case of advanced nerve disorder, or dealing with an area where it is possible to excite one of the skin-muscle reflexes, or unless we use some form of massage that excites a protective contraction. But we have seen that fatigue of a nerve precedes muscle fatigue, and it is

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possible to stimulate a nervous system to exhaustion without any visible sign at all. Many a long-distance runner, for instance, is able to sprint the last few hundred yards of a race under the stimulus of sheer will power, without showing evidence that his whole central nervous system is so "done out" that complete unconsciousness will follow a few seconds later. Even when insensible the muscles respond readily and easily to faradism, showing that the fatigue is that of the central nervous system.

Passing to fatigue of the sensory nerves, we find that a moment of over-stimulation of the second cranial nerve—say by glancing at the sun—is adequate to produce prolonged fatigue. If the stimulus is prolonged, it results in permanent blindness, a not infrequent catastrophe in southern countries. Over-stimulation of the auditory apparatus for a single moment results in a deafness depending for its severity on the strength of the stimulus, while any stimulation of the olfactory nerve or of the nerve of taste renders them temporarily incapable of rightly interpreting any fresh stimulus.

So far we have dealt with nerves of special sense, and it may be claimed that these are more susceptible to fatigue than other nerves.

In ordinary life few spinal sensory nerves suffer over-stimulation from direct injury, but many know the effect of mechanical over-stimulation of the ulnar nerve, and how very slight may be the injury which leaves long and most unpleasant after-effects. When nerve fibres are thus stimulated in bulk we are readily conscious of the effect, but it is not difficult to believe that deleterious effect could be produced in a single fibre almost without affecting the consciousness of the individual.

Very slight mechanical stimulus suffices to over-stimulate unstriated muscle—be it of the arterioles or the bowel. The danger in the latter instance is known to all abdominal surgeons, who realise that the amount of paralytic ileus after operation will depend directly on the amount and severity of the manipulation to which the bowel has been subjected.

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The first effect of percussion on the skin is a blanching of the part due to vaso-constriction, but this is soon followed by flushing due to vaso-dilatation. Both phenomena cannot be due to the same direct reflex. Different impulses give rise to different reflexes, but it is incredible that identical stimuli should secure diametrically opposite reflexes simply as the result of repetition. The explanation is that the blanching is due to the contraction of the unstriated muscle in the arterioles in response to mechanical stimulation, and that the subsequent dilatation is due to paralytic relaxation, which is due, in turn, to over-stimulation. It is conceivable that it might follow a pure skin-muscle reflex. If so, the reflex is one which causes constriction until the nerves of the reflex arc are so wearied by stimulation that nerve paralysis replaces the muscular paralysis, already considered as the more likely of the two possibilities. Moreover, we must remember that not only skin vessels are affected by our manipulations, but every arteriole, throughout the whole body, which may be subjected to the impulses.

On voluntary muscle fibre the effect of percussion is difficult to elucidate. It can cause it to contract only if used over reflex areas, or in the presence of certain diseases of the central nervous system or as a protective reflex. As a remedial agent, therefore, percussion has but feeble power in this respect. To hasten removal of waste products other means are more effective.

If "stimulating" massage for the moment is taken as being equivalent to "vigorous," and if we consider its action as a whole, we find that on the circulation the action is to "stimulate," but only if used very gently and very sparingly; if used to the faintest excess the action becomes inhibitory. This also applies to local heart treatment, as the heart is only a specialised blood-vessel and its muscle responds to mechanical stimulation in a precisely similar manner to other blood-vessels. On the nervous system the effect is "stimulating," but it is a stimulation that is almost inseparable from fatigue. It is therefore contra-indicated, save in its very mildest forms,

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if for any reason the nervous system of the part has been fatigued, or if the "tone" of the nervous system has been lowered, *e.g.*, after severe traumatism or as part of the general deficient innervation of neurasthenia. On voluntary muscle tissue its beneficial effect is negligible, while on the unstriped muscle of the abdominal organs the "stimulating" effect is a close forerunner of fatigue.

"Stimulating" massage should therefore be applied only in carefully selected cases; it is the non-realisation of its dangers that has in certain quarters brought so many accusations upon massage as a whole. Any rapid or vigorous movement of massage which is given for its "refreshing" effect should, therefore, be administered sparingly, otherwise fatigue will follow. Massage used in this way corresponds more or less to the cold plunge or shower after exercise. If used aright it is most refreshing and invigorating; if abused the result is not infrequently disastrous. This form of "stimulating" massage finds its *métier* either after exercise or between the performances of different exercises.

Massage is not a panacea for all ills, but there are few conditions in which it cannot be used with benefit to the patient. Yet there are few medical men who really believe in the effect of massage, and many never utilise it at all, because when tried in a few cases they have found it fail them. The failure has been due to misuse and abuse, and both can be traced as a rule to the untimely and excessive administration of "stimulating" massage. Take as example the following experience:—The patient—worn out, it may be, by years of over-strain, anxiety, and physical exertion—who is at last unable mentally or physically to expend another ounce of energy, is found by the masseur totally lacking in vitality. "What is the matter here, I wonder?" says the worker, if he is conscientious. "Doctor said it 'was just a case of nervous breakdown and that there was nothing organically wrong with him,' and yet he says he can't get up and go about his business. He just wants a thorough, good, stimulating massage all over." And he gets it! Small wonder then

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that the patient, whose whole illness, be it observed, is due to over-stimulation, becomes rapidly worse.

It is not uncommon to find that a misconception of the word "stimulating" has arisen in the minds of some masseurs. They appear to believe that only the more or less vigorous or violent movements of massage have a stimulating effect. This is incorrect. Even the light surface-stroking massage aims at nothing save so to stimulate the sensory nerves that a reflex response may be secured. Deep-stroking and all forms of compression massage owe their reflex action either to a similar process of stimulation or to reflex response to a mechanical stimulus. All forms of massage are essentially stimulating, even if the effect of the stimulus is such that the patient is conscious only of a sedative effect. Just as morphia or heroin may serve as the best cardiac stimulant, so surface-stroking may be the best form of "stimulating" massage to administer to a patient. But the delusion is deep-rooted—and it will die hard—that "stimulation" in massage is impossible without the expenditure of muscle energy and vigour. A delusion, however, it is; and nothing will eradicate it until the time comes when the duration of training for the massage student is adequate to ensure a sufficiency of clinical experience. This, and this only, can impart a full appreciation of the use and abuse of massage.

Two movements remain to be described which, although they may be performed in a special manner, as separate movements of massage, can yet be imitated so closely under suitable circumstances by other movements that they hardly merit separate notice. They are *vibration* and *shaking*.

As already noted more than once, a healthy limb in which the muscles are relaxed may be compared with a rubber hot-water bag filled with fluid. Thus almost the faintest touch can send, as it were, a wave of movement throughout the limb. This fact established, it is clear that any of the movements already described, with the

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exception of the superficial stroking, are able to impart in a greater or less degree a vibration or shaking movement throughout the area of the limb treated.

In disease, however, we must imagine that the water in the hot-water bottle is replaced by treacle, liquid glue or dough, according to the condition present ; and, in addition, we must imagine that sometimes the bag is divided into compartments each communicating with its neighbour by a comparatively small opening. Each phase would offer more resistance to the transmission of vibration, and hence we are bound to devise some effective means of overcoming the resistance when dealing with pathological conditions that have increased the "viscosity" of the "fluid" content of the "bag" of skin surrounding the limb.

For limb treatments particularly, and for special cases elsewhere, hand vibration is a poor substitute for many of the mechanical vibrators on the market. The best are those run from an electric motor contained in the apparatus. The rate at which the vibrations can be administered should be under control. Although the vibration is so "fine," it must be classed as a "stimulating" movement. Therefore these instruments should only be applied with caution, and never to the same spot for more than two or three minutes at a time. For reducing œdema, stretching adhesions, loosening scars, and even for loosening joints, vibration is invaluable. The addition of vibration to deep stroking of the abdomen may assist the mechanical stimulation whereby we hope to secure the reflex contraction of the unstriped muscle. All massage movements intended to act on any organ under cover of the ribs by direct stimulation do so only as the result of the vibration transmitted from the ribs.

Nerve vibrations are much advocated : nothing need be added about them to what has already been said on the subject of nerve frictions.

Shaking is merely a coarse vibration. When dealing with a limb the most satisfactory method of administering shaking is to apply the hand to the surface as if preparing to perform the deep stroking movement, subsequently

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withdrawing the palm slightly, leaving the fingers in contact with one aspect of the limb, the heel of the hand or the extended thumb being in contact with an adjacent surface (see Fig. 15). The whole hand is then moved as if the deep stroking were to be performed, but, at the same time, a quick, firm, vibrating movement from side to side is added.

Although vibration and shaking, when performed as special movements, resemble percussion massage more



FIG. 15.—Shaking the calf-muscles. Note the loose grip, and that both hands can work simultaneously.

closely than any other variety, it is essential that they should be performed with all the muscles in a state of complete relaxation. Care must be taken, therefore, that the movements are not sufficiently violent to excite a protective reflex contraction. This frequently occurs if great rapidity of vibration is employed with a mechanical vibrator, but usually it denotes that undue pressure is being exerted. When any shaking movement is applied to the abdomen care must be taken to ensure that the position of the patient is such that the abdominal muscles are completely relaxed, and that no surface irritation excites their reflex contraction.

CHAPTER VII.

MOBILISATION AS A SEQUEL TO MASSAGE.

I.—RELAXED MOVEMENT (PASSIVE MOVEMENT).

As stated in an earlier chapter, massage is merely a means to an end—the end being restoration of function. There are a few cases in which massage treatment alone suffices to attain it, and as a rule it is only in the earliest stages that treatment should cease simultaneously with the massage. In the treatment of a limb massage alone rarely, if ever, suffices ; if we are treating an abdomen with massage and fail to prescribe some form of mobilisation, we are depriving our patient of the benefits of a potent remedy. For the paralysed, mobilisation is invaluable ; even for heart cases active movement can always be prescribed with benefit, if it only consists of teaching the patient to maintain the tone of various muscle-groups by alternate contraction and relaxation.

Only when we wish to compel complete relaxation and to enforce rest on a nervous system which, in part or completely, refuses to rest, can massage alone be considered efficient without its complement—mobilisation. Even so, when we have succeeded in our attempt to secure relaxation—be it mental or physical—our work has only just begun ; and we are then left with one of the most difficult tasks to accomplish, namely, the restoration of function in such a manner that all danger of return of the original symptoms is avoided. This is really a process of re-education of function—it may be even of mental function. For instance, it is no uncommon thing for a neurasthenic to be restored to health while in bed, but the moment physical exertion is allowed the patient relapses. This is often due to confusion in the patient's mind of

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the sensations due to physical fatigue and those which were endured as part of the original illness. A few words of warning and explanation may avert catastrophe should the sensations due to physical fatigue arise ; while the onset of the fatigue can usually be avoided by an intelligent course of treatment by mobilisation.

It is essential in the first place that we should understand the full meaning of the expression "treatment by mobilisation." It consists of two main divisions :—

I. The administration of passive or relaxed movement.

II. The prescription of active movement.

I. Passive Movement.

Many workers seem to think that when passive movement is ordered it is their duty to move the part through the widest range that anatomical considerations will allow. Nothing could be a greater delusion, as usually the prescriber wishes only a minute movement to be given the first day, with small additions day by day as the condition improves. To be truly passive the movement must be carried through by the operator without either assistance or resistance from the patient. Unless the part is completely paralysed this entails the co-operation of the patient. It is difficult to allow any part of the body to become absolutely relaxed, and particularly so when that part is being moved. It is possible, but it is often necessary to teach patients how to do it, and this may require much time and patience. Without the co-operation of the patient in this active relaxation, passive movement is inconceivable, as, in its absence, the movement becomes either an assistive or a resistive movement.

I have found it so difficult to impress on those working for me that the patient's co-operation is essential to the administration of true passive movement that I have abandoned the use of this term altogether and adopted that of "relaxed movement."

The difficulty in securing active relaxation is so great,

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that attention to every minute detail, which may be helpful, is imperative.



FIG. 16.—To show flexion of fingers with extension of the wrist.



FIG. 17.—To show extension of fingers with flexion of the wrist.

The first essential is that the patient should be in a position of absolute ease and comfort, in one of the natural positions of perfect repose.

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The second is that the worker should be in a position which renders it possible to support the part under manipulation in such a manner that throughout the movement, no matter what it may be, the patient still maintains the full sense of ease and repose. To secure this the worker's movements must be so free from embarrassment that the sensation of absolute security is conveyed to the patient. The faintest trace of insecurity will be



FIG. 18.—Showing the position in full extension of the wrist.
The forearm is pronated and fingers are flexed.

countered by the voluntary or involuntary contraction of the patient's muscles.

The third essential is that the worker should bear in mind the natural positions of repose, and should remember how the patient would perform the movement prescribed were he to do so voluntarily in the position chosen.

Nature has decreed that most of our movements should be in reality a combination of movements, the result of an elaborate co-ordination of muscular contraction and relaxation. If we wish our patient to maintain a con-

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dition of active relaxation, it is essential to copy, so far as lies in our power, the movements that result from this co-ordination.

The following list will serve as a guide ; the combinations must be duly regarded whichever of the two or more movements constitute our chief aim. Moreover, for our



FIG. 19.—Showing full flexion of the wrist. Note the rotation of the forearm as compared with Fig. 18, and also the unaided extension of the fingers.

technique to be perfect, it may be necessary to perform two or more combinations at the same time :—

Flexion of the fingers should be combined with extension of the wrist : extension of the fingers with flexion of the wrist (see Figs. 16 and 17).

Extension of the wrist should be combined with pronation of the forearm (see Fig. 18) : flexion of the wrist

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FIG. 20. —To show ulnar deviation of wrist.

should be administered as the forearm movement passes from full pronation to a position mid-way between pronation and supination (see Fig. 19).

Lateralisation of the wrist in both directions can be performed in this position, but it is safer to begin with



FIG. 21.—To show radial deviation of wrist. Note slight relative pronation.



FIG. 22.—To show full supination of forearm with flexion of elbow.



FIG. 23. To show how the forearm should be carried across the front of the chest (as if it were resting on an adjustable sling) when changing from supination to pronation.

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ulnar deviation and to pronate the forearm slightly while performing the radial movement (see Figs. 20 and 21).

Supination of the forearm should be combined with flexion of the elbow : pronation with its extension (see Figs. 22, 23, and 24).

Flexion of the forearm is most easily performed if the



FIG. 24.—To show pronation of forearm with extension of elbow. The positions should be compared with those shown in the two previous figures.

elbow is pressed backwards at the same time, *i.e.*, during extension of the shoulder : extension of the elbow is performed while the shoulder is flexed and the arm carried forwards (see Figs. 25, 26, 27, and 28).

Abduction of the arm is combined with flexion of the elbow : during adduction the elbow should be somewhat extended (see Fig. 29).

Flexion of the toes should be combined with dorsi-



FIG. 25.—To show position for all early relaxed movements of elbow or shoulder. Note the combined flexion of elbow, extension of shoulder and supination of wrist.



FIG. 26.—Note the position at each joint in contrast to those shown in Fig. 25.

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FIG. 27.—To show another position that may be used during later stages of treatment for mobilisation of shoulder and elbow, the latter being extended.

flexion of the ankle : extension with plantar flexion (see Figs. 30 and 31).

Plantar flexion of the ankle calls for extension of the knee, though the knee should be kept slightly flexed even



FIG. 28.—The same as Fig. 27, showing elbow flexed. Note again the rotation of forearm.

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when the ankle movement is at its extreme : dorsi-flexion requires increasing flexion of the knee.

Flexion of the knee should be combined with flexion of



FIG. 29.—To show one position in administering circumduction of shoulder.

the hip : extension of the knee with extension of the hip (see Figs. 32, 33, 34, and 35).

Adduction and abduction of the hip is best performed with knee and ankle semi-flexed : its rotation requires alternate flexion and extension of the knee, flexion accom-

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panying that part of the movement when the hip is most flexed, and extension of the knee the part when the hip is most extended (see Fig. 35).

It is almost impossible to administer a dose of relaxed



FIG. 30.—To show flexion of the toes with dorsi-flexion of the ankle. Note the knee is bent.

movement to the lower limb except in the presence of some degree of flexion of the knee.

In all movements of the knee the slight rotatory movement that is possible must be kept in mind and be administered in flexion. In the same way, all interphalangeal joints are capable of lateral movement, but only in the

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FIG. 31.—To show extension of the toes with relative plantar flexion of the ankle. Note the knee is slightly extended as compared with Fig. 30.



FIG. 32.—To show most useful position for mobilisation of the knee. Note the "play" of the masseur's feet when comparing this figure and No. 33.

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flexed position : the inferior radio-ulnar joint frequently calls for antero-posterior mobilisation, most freely obtained with the forearm between pronation and supination, but also to a lesser degree in the two extremes of rotation (see Fig. 36). The joints at the bases of metacarpals and metatarsals are frequently overlooked, but they should all receive their dose of movement (see Fig. 37). The existence of impediment to movement in these joints—



FIG. 33.—To contrast with Fig. 32. The control in these positions is perfect.

often quite easy to correct—is a source of great weakness to the grip, or may be the cause of otherwise unaccountable limping due to pain in the foot. Though no true joint exists, mobilisation should be administered to the heads of metatarsals and metacarpals. It is often surprising to find how readily movement returns to fingers which are apparently quite stiff in extension, if the heads of the metacarpals are loosened until a palmar concave arch is visible. If the fingers are fixed and bent, the first step in treatment should be to flatten this arch. The same applies

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to manipulation of the foot. It is difficult to mobilise the carpal joints, but not so the tarsal joints. These should always receive care and attention, especially the astragalo-scaphoid and calcaneo-cuboid joints. A firm grip is taken of the foot on either side of the joints, and an "up-and-down" movement is imparted, combined with an attempt



FIG. 34.—Another method of securing flexion of the knee, the thigh being fixed.

to perform rotation of the anterior part of the foot upon the posterior.

Mobilisation of the phalanges of the hand is frequently mismanaged, with the result that a mild degree of tendon insufficiency is left undiagnosed and untreated. It often happens that after injury a patient is told to keep the fingers supple by movement. The patient obeys; but, owing to lack of instruction, movement takes place only

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FIG. 35.—To show position for administering movement to the hip. The same position is also of service when mobilising the knee.



FIG. 36.—To show the grip for lateralising the inferior radio-ulnar joint.

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FIG. 37.—To show the grip for loosening the joints between the bases of the second and third metacarpals.

at the interphalangeal joints. The metacarpo-phalangeal joints then become fixed and the impairment of movement is most disastrous. Unless there is obvious impediment



FIG. 38.—First position in performing flexion of a single finger. The metacarpo-phalangeal joint is fully flexed. Note the extension of the wrist. Either the index finger or the thumb may be used to perform the movement.

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FIG. 39.—Second position in performing flexion of the fingers. The proximal interphalangeal joint is fully flexed, the metacarpo-phalangeal has been slightly extended.

to such a procedure, the technique of mobilisation for the fingers is to extend fully each joint in turn, commencing with the distal interphalangeal joint. Flexion should then



FIG. 40. Third position in performing flexion of the fingers. The distal interphalangeal joint is fully flexed as well as the proximal. To effect this the metacarpo-phalangeal joint has been fully extended,

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be undertaken by bending down to its full extent the metacarpo-phalangeal joint ; the first interphalangeal joint is next dealt with, but towards the limit of its flexion that of the metacarpo-phalangeal joint must be *slightly* relaxed. As we continue this relaxation slowly, the terminal interphalangeal joint is fully bent and is maintained in this position while the metacarpo-phalangeal joint is straightened. The proximal interphalangeal joint is then straightened, and finally the distal (see Figs. 38, 39, and 40).

In dealing with the toes the same routine should be followed ; but here we find that, as a rule, it is the interphalangeal joints that the patient fails to exercise for himself and which tend to get fixed, while the metatarso-phalangeal joints often remain quite supple.

The aim of relaxed movement is to maintain suppleness, *i.e.*, to prevent contractures and the formation of definite adhesions or a general matting of the soft tissues. “ Little and often ” should be our guide while performing such movement as can be carried out with perfect ease and freedom, each movement being almost imperceptibly greater than the preceding. As the limit of movement that has been reached on a previous occasion approaches, the frequency gradually decreases, till finally any additional movement beyond the previous limit is performed only once. To secure the additional movement—no matter how slight it may be—is the chief aim in view, as a single relaxed movement through the extreme limits possible is of more value than a hundred movements through three-quarters of the possible range. At the same time we must remember that any trace of pain, of unevenness in our movement, of doubt in the patient’s mind—conscious or sub-conscious—of insecurity, will defeat our end by calling up a protective muscular contraction.

It must not be imagined that it is possible to take hold of a limb in which a joint is apparently firmly fixed, and administer a single relaxed movement throughout the full range. The faintest trace of pressure should be exercised in two opposing directions just as if the joint were

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really moving ; even though no trace of movement is seen at first, a minute flicker may soon be noticed. The process is continued, and presently the pressure which a minute before failed to produce movement will definitely do so. Gradually the range increases without any corresponding increase in pressure, and so the process is continued till the fullest possible range of relaxed movement has been performed. As the amplitude increases, light surface stroking should be performed continuously, and the movement should cease directly the full range that is possible in the circumstances has been attained. Relaxation must be no less gradual than the original movement.

No useful purpose can be served by repeating a relaxed movement unless there is a reasonable chance that, by doing so, an increased range of movement will be secured. The proof that the limit of relaxed movement has been reached is the appearance of a trace of contraction in a muscle either to assist or resist the movement, the first trace being a minute fibrillary tremor that can often be detected by the finger when the eye still fails to note it.

CHAPTER VIII.

MOBILISATION AS A SEQUEL TO MASSAGE (*continued*).

2.—ACTIVE MOVEMENT.

THERE is one manœuvre which can often find a place in our treatment, but which cannot be classed under the heading of “movement.” It consists of teaching the patient to contract certain muscles, or groups of muscles, voluntarily without moving any joint as a result of the contraction. For example, the quadriceps can be exercised freely even though the knee be firmly fixed by a splint ; the deltoid can be made to contract without any effect on the shoulder-joint. There are two requisites, a little tact and patience on the part of the instructor and perseverance on the part of the patient, if the full benefit is to be reaped. Few things are more injurious to muscular strength than absolute rest ; it is surprising how little exercise will maintain it. Even in the absence of joint movement, the performance of the natural function of a muscle—alternate contraction and relaxation—will often suffice, if not to prevent wasting, at least to minimise it.

Active movement may be divided into the following groups :—

1. Free movement,
2. Assistive movement,
3. Resistive movement.

1. *Free Movement*.—We must remember that gravity serves as an effective resistance against which to work, and, if a movement is performed against gravity, we are really performing a movement against resistance ; if with gravity, our movement is assisted. Thus it comes about that, in certain positions, assistance may be re-

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quired if a movement is to be truly "free." In movement of the arm, for instance, if the patient is standing, exercise with the weight and pulley may mean that movements of abduction and adduction are almost "free" because the weights counteract the weight of the limb during the movements. The so-called "free" abduction is a movement against the resistance of gravity if the patient is upright, while adduction is a movement assisted by gravity.

True "free" movement is, therefore, excessively rare; and the division of movement into "free" and "assistive" is arbitrary. It is useful, nevertheless, as it serves to remind us that active movement is "active," even though only performed with assistance.

Free movement of the fingers is best performed with the hand supported on its ulnar border, the forearm being held mid-way between pronation and supination.

The forearm being supported in this position with the hand hanging free is the correct attitude in which to perform free flexion and extension of the wrist.

Free rotation is performed starting from the same position, the hand being supported or not, according to the nature of the case.

Free flexion and extension of the forearm is best performed with the patient recumbent, the back of the arm and the elbow being fully supported and the hand moved up and down over the chest.

Free movement of the shoulder entails the supporting, by one means or another, of the weight of the forearm and hand. This may be done by giving manual assistance, by the aid of the weight and pulley, or by some other device. The resistance to shoulder movements offered by gravity can be largely counteracted if the elbow is maintained in the acutely flexed position.

Free movement of the toes, and almost free movement of the ankle, can be performed with the leg hanging straight down over the side of a couch.

True free movement of knee and hip is impossible without assistance, manual or mechanical.

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When making the first tentative experiments with free movement, the patient will often find that his endeavours are crowned with success more readily if the limb is placed in water, preferably hot. The *eau courante* bath is the ideal contrivance in which to commence free movement. The probable explanation of the success of these adjuvants is that the water, by giving perfect and even support to all the parts immersed, removes every trace of external resistance to movement. The tendency of cold to render all movement more difficult by giving rise to a sense of stiffness is a natural phenomenon : heat tends to relieve this sense, and movement becomes more easy. The effect of the swirling water is probably comparable to the effect of the superficial stroking massage already described.

It is well, whenever possible, to arrange that any free movement should be performed in combination with other movements as indicated when considering relaxed movements.

2. *Assistive Movement* opens a wide sphere for inventive capacity in the individual worker. The assistance given varies from the mildest possible touch to a finger, while the forearm floats in an arm bath, to a vigorous and long-sustained pulling process, while the patient himself is exerting the full power of normal muscle, with all the assistance that can be obtained from gravity and the body-weight.

The object in administering a dose of assistive movement is to enable the patient to do more than he could do unassisted. Thus it may serve its purpose in either of two ways : first, by enabling the patient to perform a movement without undue fatigue or strain ; second, by enabling him to do so through a greater amplitude than he could otherwise manage.

But a nicety of judgment and an exquisite tact are required to enable the masseur to decide how much assistance is to be given, be it manual or mechanical. It also requires common sense. For instance, let us take the case of a patient with a wasted deltoid who is told to

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raise his arm into a position of full abduction at the shoulder by means of a weight and pulley. It is not unusual to find that the masseur allows the patient to perform almost the entire movement with the scapula ; or, perhaps, fondly imagines that by increasing the weights the exercise to the deltoid will be increased, whereas the real effect is to render elevation of the arm more easy, while only increasing the exercise of the adductors.

Another point, frequently overlooked, but worthy of the closest attention, is this : There is a universal law that if one muscle contracts in order to move a joint some other muscle or group of muscles *must* relax. Let us be sure, then, that, when we want to assist the movement performed by one muscle, we are not merely giving a resistive movement to its antagonist.

A third consideration is of vital importance to the success of this method of treatment, namely, that the dose of assistance is progressively lessened if the range of movement is unaltered. On the other hand, with increase of range of movement there should be no increase of assistance, unless the resistance to be overcome is out of proportion to the increased range.

Let us now consider in detail the various methods in which assistive movement can be administered.

The most simple has already been mentioned, namely, assistance rendered to the movement of a limb which is floating freely in a water bath. If the patient is sufficiently bad to require this treatment, it will probably be necessary to make our first movements purely passive, and then to instruct the patient to make an effort to copy, while we merely guide the movement.

If voluntary movement is already in part restored, assistance should not be given to such portion of the movement as can be performed voluntarily ; but as the power to complete the movement gradually fails, we commence, and equally gradually increase, the assistance given. But as our assistance is only a means to an end, it is essential that we should note the amount of assistance given on

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any one day, and aim to secure a similar result with a decreased amount of assistance at some definite date in the near future. The amount of improvement may indeed be infinitesimal, but still it should be there and should be noted, otherwise we are wasting time.

There is one exception to the rule always to allow a patient to perform a movement without aid as far as possible, and then gradually to add and increase assistance. No movement should ever be allowed, the performance of which calls forth a coarse, functional tremor in the contracting muscles. The contraction must be stopped immediately and the patient shown how to perform the movement without tremor—by first performing it for him with all the muscles in a state of active relaxation and then allowing the muscles gradually to assist. In other words, the patient assists the masseur rather than *vice versa*.

If the impediment to movement is due to causes other than pure muscular disability, the administration of movement becomes a most difficult process, owing to the fact that, almost inevitably, the muscles that oppose the movement will pass into protective spasm. Here the skill acquired in securing relaxed movement finds its greatest test in efficiency. The problem presented is how to administer what is really a forced movement. There are two ways: the first is to do it for the patient, the second to let the patient do it for himself.

To do it for the patient it is essential that, as far as possible, the movement should be performed during active relaxation of all muscles. But sooner or later the antagonists of the movement will pass into protective spasm. The closest possible watch must be kept for this reflex contraction, as it is possible to counter it, by calling on the patient voluntarily to contract the muscles which control the movement we are attempting to perform. Voluntary contraction of any muscle involves reflex relaxation of its antagonists, and this, so to speak, voluntary reflex, can overcome the involuntary protective reflex, provided that the stimulus exciting the latter is not too severe. If it is,

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the patient will suffer all the pain of severe cramp in both groups of muscles, and this is equivalent to the pain of the muscular spasm that follows recent fracture. Hence the need for care, gentleness, and tact in the performance of forced movement in the massage-room.

Another method is to accept the contraction of the antagonistic muscles as inevitable, and attempt to overcome their resistance by a very protracted, steady pull, while applying firm kneading to the whole of the area throughout which contraction can be detected. This is a slow, laborious and not over-successful scheme, and forms a very indifferent substitute for prolonged splintage with pressure or tension. If utilised, the relief of the tension must be very gradual, or great pain will be given.

One useful little scheme is worthy of record. If a patient is flexing his elbow and then straightens it, at the moment when he changes his action from flexion to extension all muscles must be completely relaxed. If assistance is being administered to flexion at this moment, *i.e.*, if flexion is assisted and extension resisted, the whole of our assistance is given for a short space of time during which perfect relaxation is present. By this simple expedient it is often possible to administer a considerable dose of forced movement unknown to the patient. If it is omitted, mechanical assistance to a movement, *e.g.*, by weight and pulley, possesses an incontestable advantage over manual assistance. If, however, it is kept in mind, intelligent manual assistance must always take precedence over the unintelligent mechanical assistance, save only in expenditure of skilled labour and time.

A patient can perform a forced movement by utilising the force of gravity in various ways, though the most simple is, as a rule, through the medium of the body-weight. Thus the ordinary squatting, heel-raising-knee-bending exercise can secure a very violent forced movement of flexion of the knee ; and exercises on a horizontal bar can be made to perform the same function for a stiff elbow. Examples might be multiplied throughout the whole range of remedial and educational exercises and gymnastics.

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3. *Resistive Exercises*.—The resistance may be administered by the worker in two ways, or, as in the case of assistive exercises, the force used may be derived from mechanical apparatus. Of the latter little need be said : the converse of the various points raised when dealing with assistive exercises by apparatus will be found to hold good.

If the worker is supplying the resistance, a movement may be performed by the worker while the patient resists (excentric), or by the patient while the worker resists (concentric). It is plain that in performing the latter the amount of resistance given depends on the worker, whereas in excentric the patient arranges the matter for himself. In concentric movement the muscle exercised shortens in length in the natural manner ; whereas in excentric movement, although contracted, the muscle may actually lengthen.

When treating a muscle during the early stages of recovery from paralysis, excentric movement should never be employed throughout the whole range of movement. But during recovery it is usual to find that a patient is able to offer slight resistance before any actual voluntary movement can be performed. At the same time we must bear in mind that whatever tends to stretch the muscular fibres is to be deprecated. Hence the law governing treatment of this condition is that the administration of excentric resistive exercise may be performed only in the inner half of the path of contraction. This means that the movement of the part is limited in range to the final half of the movement that can be attained by the contraction of the muscle when in health.

Concentric movement is easy in application and of the utmost service during all the earlier stages of treatment. It is of particular importance to utilise it as early as possible, when it may take its place in the middle of a prolonged assistive movement. For instance, if the biceps humeri is very weak, it is possible that movement from the vertical to 30° may call for assistance ; from 30° to 60° there may be enough strength to raise the forearm against

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the resistance of gravity. By this time the muscle is shortening and gaining in power, so it may be possible to supplement the resistance of gravity up to the right angle. Soon after, perhaps, the muscle is only strong enough to continue the movement against gravity, and lastly assistance may be required to finish the last few degrees of movement. The management of the resistance obviously requires skill and care, since it starts from negative (during the assistive stage), passes zero, rises to a maximum, passes to zero again, and finally becomes negative. In a movement of wide amplitude, such as that of full flexion and extension of the elbow, the problem is fairly simple ; but in dealing with a movement of small amplitude, such as rotation of a forearm, which perhaps is further limited by pathological change, the utmost delicacy of touch can alone suffice.

CHAPTER IX.

THE USE OF APPARATUS FOR EXERCISE.

As we have already seen, almost every form of exercise may be classed, more or less, as an assistive or resistive exercise, and the description of mobilisation as a sequel to massage is, therefore, not complete without some

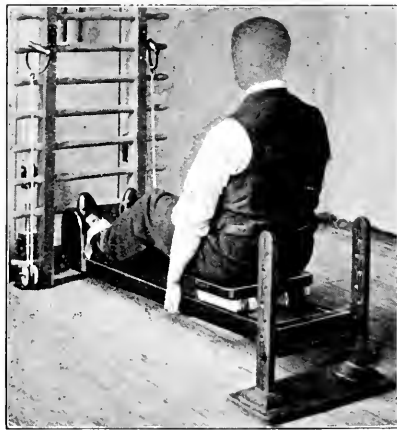


FIG. 41.—The first position for exercise on the sliding-seat. Foot-piece loose.

account of the exercises which are most frequently used as a complement to massage work.

The vast majority of Swedish exercises are commonly referred to as “free” exercises : in reality many of them depend very largely for their success on the action of gravity assisting or resisting the movements performed. For educational and remedial purposes they would be perfect were it not for two great disadvantages. The first is that it is difficult to inspire the uneducated with sufficient zeal either to master or to perform them efficiently ;

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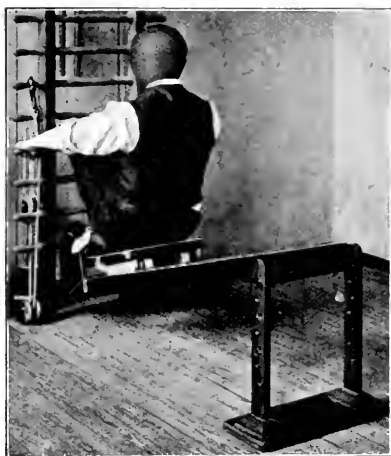


FIG. 42.—The last position for exercise on the sliding-seat. Foot-piece fixed and flexion of the knee assisted by the pull of the arms. It is evident that this position affords an admirable introduction to the high curtsy sitting position.



FIG. 43.—The same as Fig. 42, only showing assistance given by the patient to secure full extension.

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and the second is the difficulty of securing an efficient teacher. A perfect knowledge of what are commonly called Swedish Remedial Exercises does not render the teacher efficient, unless there has been at least a firm grounding in Swedish Educational Exercises.



FIG. 44.—To show the first exercise with the weight and pulley for re-educating the quadriceps. Note that this muscle is doing no active work at all.

It is impossible not to realise that there was something very human in the old villager, who informed the doctor about to prescribe for him, "I likes summat black as stinks." So, too, there is somewhere in human nature a desire to see the result of work performed ; and, especi-

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ally with the uneducated, there is a sense of satisfaction in seeing a weight ascend, in response to a pull on a cord which passes over a pulley. So much is this the case, that a patient who is content to spend twenty minutes in the performance of this exercise will frequently refuse to spend five if requested to use a roller-towel instead!

Also it is more simple to teach patients to graduate their exercises with the use of apparatus than without it.

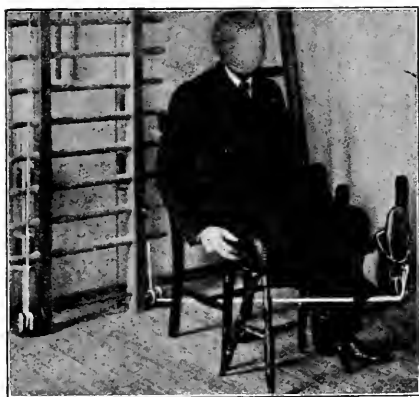


FIG. 43.—Exercising the quadriceps with weight and pulley while sitting. Note that the muscle is now called upon to contract strongly.

But the more simple the apparatus, the better will be the result.

Few of those who are interested in massage work will fail to know the fame of Wharton Hood. His reputation for being able to restore function to limbs that seemed doomed to permanent weakness was very great; and yet his remedial agents were almost entirely confined to movements under an anæsthetic and subsequent exercise of some form or other with a weight and pulley apparatus. Some of his original apparatus is in use at the Military Orthopædic Hospital, Shepherd's Bush, and is of the most simple character. With this exception almost all the apparatus used in this hospital was built on the premises

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by Mr. Hobbs, chief carpenter to the Hammersmith Infirmary, according to the plans and directions of the author. The main structure is depicted in the appendix. Though rather more complicated than Wharton

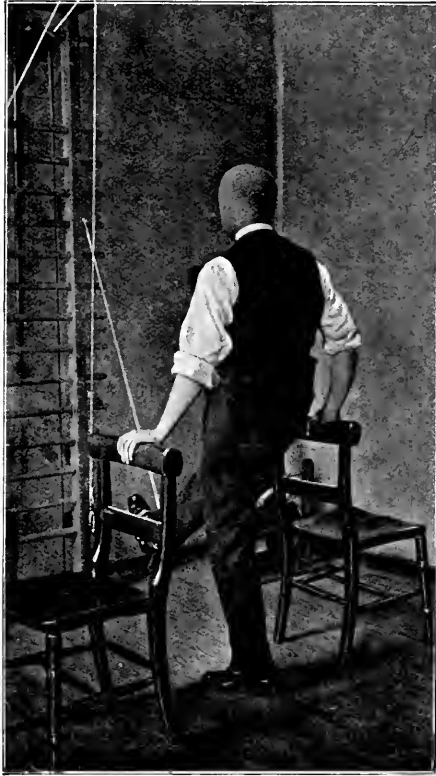


FIG. 46.—To show assistive exercise for extensors of the hip. Increase of weight gives resistive exercise for the flexors.

Hood's apparatus, it remains perfectly simple, and the additions were made chiefly to meet the special requirements of a military hospital. It is very hard to persuade wounded "Tommy" faithfully to carry out any form of Swedish exercise, remedial or educational; and even the countless varieties of exercise with weight and pulley

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pall in time. The addition of the ladder helps to give variation and adds interest.

An attempt will be made to indicate the exercises that are suitable for various conditions, when later on we come



FIG. 47.—To show how the exercise depicted in Fig. 46 can become a resistive exercise to the flexors.

to deal with each condition in turn. There are, however, certain laws which apply to all exercises.

The main point to remember in prescribing exercises is that the dose must be steadily progressive.

As an example let us consider the scheme for restoring a leg, the muscles of which are wasted by disuse—let us

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say after an attack of typhoid, so as to exclude the necessity of considering any particular joint or muscle-group.

The patient starts with exercises on the sliding-seat

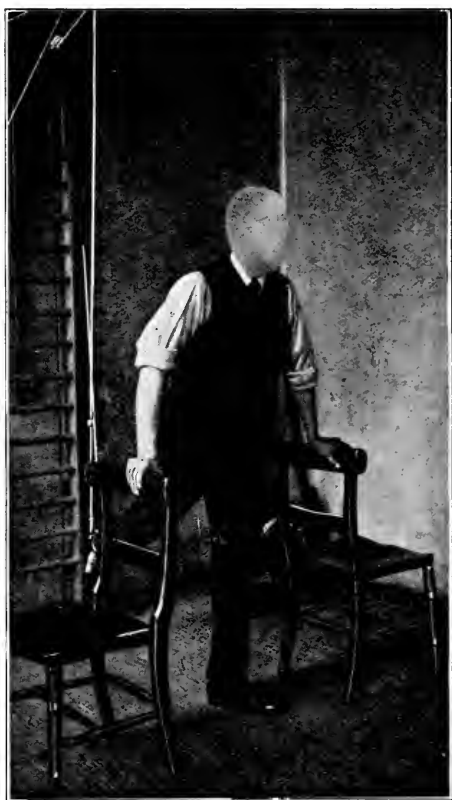


FIG. 48.—To show resistive exercise for the extensors of the hip. The flexors receive assistive exercise.

with the rails practically horizontal. He may even have to assist flexion by the use of his hands under the rail, by the aid of the floor pulley and weight (see Fig. 41). Day by day the inclination of the rail is increased, the foot-piece being left loose. When the inclination can be increased no further, it is reduced and the foot-piece is

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fixed. The inclination is then gradually increased to its maximum (see Figs. 42 and 43).

The next stage is exercise with the weight and pulley in the sitting position (see Figs. 44 and 45), then in the standing position (see Figs. 46 to 49). As it is possible with pulleys at three different levels to devise eighteen



FIG. 49.—To show how the same exercise as that depicted in Fig. 48 can become a resistive exercise to the extensors of the knee as well as of the hip.

varieties of movement, each capable of two or three minor modifications, and all being open to at least six alterations in the weights used, it is obvious that three or four weeks can be passed with some daily addition or alteration to mark the daily progress, should such frequent change be deemed of advantage from the psychological point of view. From the purely physical standpoint it would probably serve to make several additions at once, say

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twice a week. Then, if the patient tires of this form of exercise, an ever-increasing portion can be replaced by exercises on the ladder.

The aim of the prescriber should be to make the alterations so trivial that the patient's muscles fail to recognise that extra strain is being put upon them, while his mind is able to note the changes that mark his progress. At the same time the alterations should be so frequent that an ever-increasing amount of exercise is performed.

Another method of recording progress, say after injury to a knee, is to mark on the rail the position to which the sliding-seat can be moved the first day. Every subsequent day an attempt is made to advance the seat, say half an inch. In a week perhaps the seat has advanced three inches, which entails a considerable amount of extra flexion in the knee-joint. Often this fact will pass unnoticed by the patient, whose attention is fixed on two small marks under his sliding-seat.

Another useful, but little-used, scheme for assisting the return of movement in a joint that has become stiff is to encourage the patient to perform some exercise with the weight and pulley or on the sliding-seat, and to assist the movement by manipulation round or near the joint at the same time. It is often of the greatest value to knead the structures which become tense as the limits of movement are reached. When using the sliding-seat, mechanical assistance can be provided by attaching the weight and pulley to the knee.

In devising a scheme of exercises, not only has a steady progress to be arranged, but it is essential to make sure that we know exactly what it is we want to exercise, and to lay our plans accordingly. If a muscle, *e.g.*, the acromial portion of the deltoid, is to be exercised to its full extent, the correct plan of campaign is to ensure that it can relax and contract freely. With this object in view it is not wise to start by making it contract against resistance, but with assistance. Hence the first exercise with the weight and pulley is to allow the weight to abduct the arm to its full extent without any exertion on the part

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of the patient, while the adductors are exercised in elevating the weight during the return of the arm to the side (see Fig. 50). Although the deltoid is called upon to do no work whatever so far, its fibres are none the less con-



FIG. 50.—Showing “passive” exercise of the acromial part of the deltoid. Note the patient stands to “attention.”

tracting and lengthening with each movement. The weights are then reduced, so that to perform the movement the deltoid has to assist in raising the weight of the arm against gravity. When this can be done freely without the use of weights at all, the patient turns completely round and the weights are once more increased so as to

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assist adduction while resisting abduction (see Fig. 51). The patient during abduction is now experiencing concentric resistive exercise in his deltoid and excentric during adduction. Moreover, the addition of weight now increases the vigour of the exercise for the deltoid, while in the first position decrease in the weight produced the same effect.

In performing all exercises care should be taken that



FIG. 51.—The converse of Fig. 50. Here the muscle is doing a considerable amount of "work."

the patient stands strictly "to attention" throughout. General fixation of the whole body, except of the part exercised, adds greatly to the value of all exercises. The explanation would appear to be that the general rigidity of the body tends to give the contracting muscles a fixed rather than a variable point from which to obtain a purchase.

It sometimes happens that contraction of one muscle is a cause of pain, owing to adhesions between it and another adjacent muscle. Considering the deltoid once more, it sometimes happens that pure abduction and

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pure flexion of the shoulder both cause pain at a certain point in the muscle, which can be located between the clavicular and acromial elements. If weight and pulley exercises are commenced so that the limb moves in a plane mid-way between flexion and abduction, no pain



FIG. 52.—In this position the clavicular and acromial portions of the deltoid contract and relax in unison.

is experienced (see Fig. 52). By adding an infinitesimal element of flexion and abduction alternately, it is often a simple matter to free the offending band—an operation that cannot be performed by any amount of movement under an anæsthetic.

The ordinary weight and pulley apparatus requires to be supplemented by a roller and rotator apparatus as shown in the appendix, and it is much better that this

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should be controlled by weights rather than (as is usual) by friction.

Some patients lack rotation of the forearm, and so it is difficult for them to exercise on the ladder. The detachable upright rods were supplied to the apparatus at the Military Orthopædic Hospital, Shepherd's Bush, to overcome this difficulty, and also to provide rigid poles for pole exercises.

A nautical wheel, or a bar slung from its centre, is of great service in exercising the trunk, shoulder, and arm muscles. Resistance must be arranged by friction.

A stationary bicycle helps to develop the muscles of the leg, and an ideal equipment would include an instrument for circumduction of the arm and another for the ankle.

Given these things, there is no necessity whatever for any Zander or Pendulum apparatus. It is imposing, and perhaps it may add novelty to treatment; but exercises, which cannot be devised with the apparatus previously mentioned, cannot be performed by any mechanical agency.

It will be noticed that little has been said in this chapter on the subject of Swedish exercises. This is not intended in any way to belittle their value. For a worker to be thoroughly efficient they must be known and studied, and may replace those suggested or may supplement them. The ideal method of treatment is to instruct the patient in the appropriate exercises in the massage-room, and to allow him to perform them elsewhere, utilising the remainder of his time for massage, and for exercises of such a nature that he cannot perform them unless aided either by the worker or by apparatus.

It will also be noticed that reference has always been made to the weight and pulley—never to the exerciser, lest we seem to allow the introduction of an elastic exerciser, which implement, while it may be good enough to serve as a “morning refresher,” is useless for remedial work.

The use of the terms “weight and pulley” apparatus,

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“ladder,” “roller and rotator,” etc., may sound rather formidable. A little ingenuity fortified by some kitchen weights, a pulley, one or at most two hooks, a chair, a stool, an iron bedstead, and a door-handle— the injured hand turns one handle while the sound hand resists or assists the turning of its fellow on the opposite side—will suffice for nearly every need. The addition of a broom-handle and an iron poker to the armamentarium is always useful.

CHAPTER X.

GENERAL RULES FOR MEDICAL GYMNASTS.

THE masseur is born, not made. As the pocket-knife is unsuitable for surgery, so some hands are unsuitable for massage, and no training or teaching can make them otherwise. Given the hands, the training, and the teaching, constant practice is essential to the maintenance of an efficient technique: without it the masseur "rusts" no less surely than the pianist.

Much has been written on the personal attributes to be desired in those who undertake massage work: perhaps the first is that they should have suffered illness or injury themselves, and have undergone a course of treatment. It is impossible for a person in health to realise the torture that can be inflicted by inefficient massage, and its extraordinary power of irritation, though being practised on by one's fellow-pupils during training is supposed to fill the deficiency. It does not, and massage with faulty technique must be endured after severe illness for its possibilities to be believed. The experience—referred to as hideous, torture, maddening, exhausting and so forth—is invaluable.

No great power or muscular development is required in the masseur: knack can effect more than force, and skill replaces physical strength, except when treating complaints such as obesity and fascial thickenings. For the treatment of these and similar maladies medical gymnasts should always be endowed with good physical strength. Patience is essential, and that not of the Kismet type, but of the ever-hopeful and optimistic. Sometimes it is necessary to perform our work week after week—even, it may be, year after year—with the certain knowledge that all we can hope to accomplish is to retard to the uttermost the downward path of the patient. Here optimism that refuses to acknowledge the gradual defeat

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may help the patient as much as, if not more than, the treatment. More and more is it becoming recognised in general medical work that the psychical side of existence must be acknowledged, and that its influence on recovery is great. In massage work this is more obvious than in most of the other branches of medical treatment ; and it is impossible, in selecting a worker for a particular case, to ignore the personal factor. It is part of the masseur's duty to inspire the hope of getting well ; it may be, even to instil the desire to do so. Fear of disappointing the worker has often been the sole incentive to the perseverance that has ended in recovery ; and desire to prove to workers that their efforts are being successful frequently hastens recovery.

Self-assurance that is not aggressive is a valuable asset, just as timidity and lack of firmness may be the reverse.

Though introspection in a patient is never beneficial if it consists of a study of symptoms, it may be of great help if it begins and ends with attempts to note their decreasing severity and the gradual restoration of function. It is for this reason that no treatment can remain unchanged if it is to be beneficial : it must be steadily progressive, no matter how slight the progress may be, unless, indeed, the task is set merely to retard the inevitable downward passage.

Though obvious, it is well to emphasise that the masseur should never arrive at work over-heated or out of breath, and the hands, if cold, must be warmed before commencing treatment. The worker must never be in a hurry.

The care of the hands is one of the first duties of the worker, and the lotion used at St. Thomas' Hospital is of great service. The prescription is :—

R	
Glycerini	℥i
Pulv. Tragacanth.	℥i
Ol. Lavandul.	℥x
Aq. Dest.	ad ℥v
M. It. Lot.	
Sig.	For the hands.

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In war-time the hands must be sacrificed to the munition factory and glycerine be saved. Cold cream of the "vanishing" type is the best substitute. A fatty cream should be used at night if necessary.

In all treatments, even of the most vigorous type, the massage at the beginning and the end should be of the gentlest and most soothing nature, rising in *crescendo* and passing off in *diminuendo*.

Each worker has his own favourite lubricant. The best is the simplest, namely, French chalk. This may be improved very cheaply by adding ten minims of the oil of bergamot, or any other volatile oil, to each pound of chalk.

Soap and water has its obvious attractions in hospital out-patient practice and is delightful to work with. In all cases of injury the patient will appreciate its use at the earliest possible moment.

Oil has its uses, particularly in softening a hard or scaly epidermis. Some workers seem to secure better results with oil than with powder, but it is a personal factor in most instances. The improvement in appearance after using oil is sometimes very marked, and it may add greatly to the patient's comfort. It is an undoubted fact that some oil is absorbed, but a very wide area must be treated for any real benefit to ensue. Inunctions, *e.g.*, with mercurial ointment, cannot be considered as a part of massage, and the use of thyoscyamine preparations as an adjunct to massage is disappointing.

To shave a part as a preliminary to massage is usually a confession of lack of skill : it should never be necessary, as even massage of a scalp well clothed with hair presents no difficulty to the skilled worker.

The personal comfort of the patient throughout treatment is worthy of the closest study ; only less so is that of the worker. It is impossible to perform massage efficiently while cramped or in discomfort from any other cause.

As will be seen later, human life, its functions and actions, are subdued to a natural rhythm. Our object

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in massage being to restore function, it is obvious that we must maintain, and may perhaps assist in the restoration of, rhythm. Let us see to it, then, that our movements are rhythmical.

The responsibility for the treatment of a patient rests entirely on the medical man. The only responsibility of the masseur is to see that orders are carried out implicitly, and, if dissatisfied with the progress made as the result of the faithful performance of these orders, to report accordingly. It is a fatal mistake for the masseur to assume a responsibility which belongs solely to the person who recommended him as a fit and proper person to carry out his instructions. If the masseur has any suggestions to make as to alteration of treatment, or if asked by the patient to make them, the matter must always be referred to the medical man. If treatment fails, the worker is then blameless: had the alteration been made, he would assuredly become the scape-goat. The plea "I thought you would not mind my trying so-and-so" is unavailing; and "Oh, the patient asked me to do it!" is no excuse.

Were it not for the frequency with which it is said, it would seem almost superfluous to add that the "I wonder if you have tried so-and-so" of worker to patient is the acme of disloyalty. Also, it is no part of the masseur's duty to advise on the choice of stimulant or aperient; or to recommend remedies for head-ache, indigestion, flatulence, and so forth. It is disheartening to discover the frequency with which these crimes are committed. If only the masseur, who has done these things, would think of the responsibility entailed, he would, for purely selfish reasons, never do them again, putting aside all ethical considerations as to loyalty.

Massage work in this country is so largely in the hands of female workers that a mere man offers with diffidence a few further suggestions. His only excuse is that he has been particularly requested to do so.

In conversation with patients it is highly desirable to avoid professional "shop," and the worker must always

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be ready with some substitute for those patients who may be talkative. A good general education is therefore a most valuable asset, but it must be backed by strenuous endeavour to keep abreast with current topics. Otherwise "shop" becomes inevitable, and indiscretions almost equally so. Education will also help to render the worker adaptable to the surroundings as well as to the individuality of the patient, and *savoir faire* may cover a multitude of errors in other directions.

"A smiling face oft masks a breaking heart" in the masseur, but if it does so the patient should never be conscious of it. It is essential to be consistently the same in manner and behaviour to each individual, as nothing could be more distracting to a patient than to be the victim of moods or petty irritations. Also boasts of past feats are of no interest to the patient. If success attends the treatment there is no need to boast; if it fails the boaster is stamped as a liar for all time. The necessary confidence is instilled into the patient by general demeanour and deportment rather than by the spoken word, and is dependent on the self-confidence of the masseur, which, however, must not be blatant. The disbeliever will be converted by the progress made, and not by promises.

Cheerfulness is essential, but it must be adapted to the needs of the patient. It may jar most horribly to be approached by a person with a beaming smile and a flow of chatter the day after a limb has been broken; whereas a fortnight later these may afford the only break in the tedium of a long and wearisome day. Inquisitiveness should be kept under strict control, and all sentimentality should be banished completely from the sympathy that may be felt for the patient.

Though on dangerous soil, it may be said without offence that the dress should be inconspicuous, and preferably of some washing material. Failing this, an over-all should be worn. An untidy head shows off to great disadvantage in this costume. The author has known an excellent masseuse to lose a valuable connection through appearing without having removed the dust of yesterday from her

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neck during the morning ablutions. Bangles, rings, and bracelets should of course be barred, except perhaps a well-fitting watch-bracelet. A little stand for the watch, so that it can be stood up beside the patient's bed, is more business-like and quite inoffensive.

Training should have instilled order and system till both are ingrained and natural. Untidiness, hesitancy, or lack of system are all inimical to success. Punctuality is a virtue that should be cultivated.

Observation and the power to draw correct deductions from the observations made are all-important, and the eyes and hands should be constantly on the alert to detect every change, physical and, if possible, psychical, in the patient. To utilise aright the deductions made by constant observation, a certain amount of authority must be exercised by the masseur. Every care must be taken not to be dictatorial, but equally all trace of familiarity must be avoided. Self-respect and self-control are essential, and any departure therefrom invites lack of them on the part of the patient. Any suggestion of slackness in movement or posture tends to degrade the professional worker in a sick-room.

But before all comes loyalty—loyalty to the medical man and loyalty to the patient. If these should prove to be irreconcilable, it is better to throw up the case. There are few medical men who would fail to appreciate the sacrifice of a good case for adequate reason; there are fewer still who would forgive continuation of work if such reason existed.

CHAPTER XI.

THE TREATMENT OF RECENT INJURY BY MOBILISATION AND MASSAGE.

JUST LUCAS-CHAMPIONNIÈRE was, during his lifetime, the most eminent champion of the use of massage in the treatment of recent injury, and his work and writings have left behind him an impression which will never be eradicated from massage technique throughout the civilised world. His chief literary effort, "*Traitement des Fractures par le Massage et la Mobilisation*," was, unfortunately, ill named. His whole teaching was founded on the axiom of Aristotle—"Movement is life"; and far less misconception of his work would have arisen had he chosen in selecting the title for his book to reverse the order of the words "massage" and "mobilisation." This would have helped to emphasise the fact that it was written, not to extol the use of massage, but to advocate the reduction of immobilisation to the minimum. With this in view, and with this only, did he originally advocate the use of massage. Indeed, almost up to his death he valued massage little, save as a means to an end, that end being a dose of mobilisation. It was only in recent years that the great master began fully to appreciate how much the effects of massage can assist recovery, even apart from the benefit conferred by the subsequent dose of mobilisation. The latter, soon after injury, is impossible without the aid of massage. None the less the treatment of recent injuries by massage did not exist for him: it was always treatment by massage *and* mobilisation that he advocated.

At the outset, then, let it be clearly understood that in treating by massage a limb which has sustained a recent injury, the massage is applied only as a means of preparing the way for a dose of mobilisation.

The Treatment of Recent Injury.

The immediate treatment of all injury is in the hands of the surgeon, and it is rarely that the masseur has the opportunity of administering treatment before effusion has taken place in and around the damaged structure.

If fortune is kind and the aid of massage is invoked in the earliest stage, the correct method is to place the hand firmly over the injured part and apply a kneading movement slowly and patiently, the hand never relaxing its pressure sufficiently to allow any trace of hæmorrhage from vessels that may have been torn. By this action we are attempting to secure a dual mechanical result, first, to prevent further effusion (be it of blood or lymph) until there is a reasonable hope that clotting in the injured vessels has taken place, or until some other means of securing the same end is enforced ; and, second, to hasten the removal of any effusion that may have already made its appearance, before it has had time and opportunity to commence a process of organisation. As soon as all trace of effusion has vanished—it should only require five minutes or so to accomplish this—the part must be bandaged firmly. And herein lies a great source of danger. It is usual to apply a bandage which is almost non-resilient and which at least exerts an uneven pressure. It is almost impossible with any bandage (with most of those made it is entirely impossible) so to apply it that each turn exerts exactly the same amount of pressure as every other turn, and also so that the pressure exerted by the central part and by the two edges is identical. Any unevenness in pressure and any insufficiency of resilience alike court disaster. It should be an unalterable rule that no bandage should ever be applied with a view to the prevention or checking of subcutaneous effusion unless there is a sufficiency of padding between the skin and the bandage to ensure that neither of these risks is run. By “sufficiency” is meant anything from six to ten thicknesses of cotton-wool of the type usually sold as “surgeon’s.” Moreover, this pad should completely surround the injured part, and then, but then only, is it safe to apply a so-called “firm” bandage.

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As soon as this has been safely accomplished we are in a position to continue treatment on the lines about to be described, only now we are using our massage as a preventative rather than a curative measure.

To understand what we hope to do by our massage it is necessary first to realise what has happened. It will be more simple to take an actual case as a concrete example, and then to consider the various details that are applicable to other injuries. Let us suppose that a patient has stumbled and sustained a fissure fracture through the lowest inch of the radius. A fissure fracture is chosen so as to eliminate the surgical aspect of the case as regards the necessity of "setting" the fracture and any serious liability of the fragments to alter their relative positions. There has been no lateral force, the lower fragment has not moved, and therefore the periosteum will be still sufficiently intact to serve as a strong internal splint, although it may have been torn to an extent which will allow exudation of blood from the fractured surfaces.

The severity of the injury is adequate to ensure that there will be an intense teno-synovitis and that the wrist-joint will have sustained a traumatic arthritis. The ligaments of this joint will also have suffered—a few fibres of the internal lateral ligament may even have been ruptured. The inferior radio-ulnar joint will almost certainly be involved, and it is possible that the articular surface of the glenoid cavity in the shoulder may have been severely injured. For the moment we will assume that this complication has not taken place.

What has happened, then, is this, there is a fissure of the bone, and there will be some extravasation of blood from the fracture. Some ligamentous fibres will have torn with similar result. There is a traumatic arthritis of at least one joint, and a teno-synovitis of the tendons of the wrist.

Taking it for granted that sufficient time has elapsed for hæmorrhage to have ceased, or that immediate treatment has been carried out as already indicated, we know the direct result of injury, but the indirect has yet to be

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considered. Failing immediate and adequate treatment, this will take the form of general swelling and œdema. Some of the swelling is doubtless due to the outpouring of blood, but this is only local, and cannot possibly account for a swelling which may be intense from the finger-tips to the elbow or above.

Various explanations have been advanced as to the pathology of œdema after injury in the absence of sepsis. Local effusion may add to the general swelling: it does not cause it. The venous return is deprived of the assistance normally rendered by muscular contraction, but this cannot suffice to account for an intense œdema that may make its appearance in the course of a few hours. Mechanical obstruction to venous or lymphatic return might play its part in a few selected cases where fracture or dislocation has caused pressure on a main venous trunk, but the swelling may be very acute even if this possible source of trouble is wanting. Ill-applied bandages or splints will, of course, greatly aggravate the swelling by supplying the obstruction which the injury has failed to provide.

There remains one more explanation—reflex disturbance of the vaso-motor mechanism. There is evidence that this is the true cause of most of the swelling. If we consider the œdema following all fractures through the lowest inch of the radius, it will be found that, given equal severity of injury, it will be greatest in elderly patients, least in children, and varying in severity according to age throughout the intervening periods of life. For this phenomenon there is no other explanation than that it is due to vaso-motor disturbance, which is prolonged in the aged, transitory in children, and of a duration which varies directly with the so-called “powers of recuperation” at various ages.

We are left, then, to devise a treatment for definite injuries to certain structures, and for a disorganised circulation.

Obviously we cannot heal torn fibres by massage, but we can assist in restoring the circulation on which the

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repair depends, not only the repair of these fibres, but of all the various injuries that have been sustained.

Keeping in mind that the circulatory system is the curative agent, and that this has suffered reflex disorganisation, it becomes apparent that the first duty of the masseur is to counteract this inimical reflex if possible. This can be accomplished in one way only, namely, by sending up to the nerve centres stimuli calculated to procure what might be called, in contra-distinction, a beneficent reflex. In massage we have an agent that can directly assist in procuring this reflex, and in massage alone. The technique that should be followed will be clear from what has been said in the preceding chapters.

The first duty is to send up to the posterior nerve roots stimuli which will procure a reflex to counteract the stimuli from the injury. This is done by slow, gentle, rhythmical stroking of the surface of the limb. From hand to elbow may suffice, but it is often necessary to make a long, straight, steady sweep from wrist to shoulder, or *vice versa*. The arm must be hanging comfortably by the side with the forearm and hand firmly supported. In a few minutes the patient will begin to feel the pain "easing off," and the worker notices that the forearm no longer presents the brick-like resistance to the hand as it passes along. A few minutes later the forearm will become as soft as the arm, and the patient will experience great relief.

It is probable that some involuntary relaxation of the fingers will be noticed as the spasm passes off. The first indication that the masseur will be able to note is the general softening of the forearm muscles. As soon as the latter are quite soft it will be found that the fingers are no longer maintained rigidly fixed, and the support that they have hitherto received may be slowly and alternately withdrawn and replaced. This will impart a slight movement, which will gradually increase in amplitude. As soon as they are capable of relaxed movement through a perceptible range, the support of the hand may be so altered as to allow a slight dropping of the wrist and return

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to its former position. The movement, imperceptible at first, gradually increases, when a small degree of rotation may be added by slightly altering the position in which the support is re-adjusted. It is now possible to administer flexion of the wrist with supination, and extension up to the original position with returning pronation.

In no circumstances must extension of the wrist exceed the position in which the hand is normally held,



FIG. 53.—Correct position for carrying the forearm in a sling.

say in the action of writing, as, if it is increased beyond this, there may be danger of tilting the lower fragment.

If, when the muscles are relaxed, there still remains a certain sensation of hardness under the stroking hand, it is due to œdema. It is possible for the œdema to be so soft that the simple surface stroking will send, as it were, a wave of movement throughout the whole of the soft structures of the limb. If it is apparent that these structures are not sufficiently flaccid to permit of this, despite perfect relaxation, it will be necessary to administer a

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dose of kneading—very gentle in character—maintaining as far as possible a definite rhythm. It is well to commence with the arm and then to knead for a few inches below the elbow, returning to the arm subsequently. The middle of the forearm is treated next, then the proximal part of the forearm, and then the arm once more—gradually working down the forearm towards the wrist,



FIG. 54.—Fixation of sling round the neck. The loose "tails" may be attached to a ribbon which passes round the body and is tied round the waist.

always emptying upwards, and always ensuring that the whole of the limb that lies proximal to the last new portion to be treated receives its renewed dose before another more distal portion is attacked. So we go on till the neighbourhood of the fracture is reached, and this is scrupulously avoided, although the hand and fingers may receive a slight dose. The kneading may precede or follow the mobilisation, or the latter may be administered in two doses before and after the kneading. In either case the

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séance terminates with a few minutes of the surface stroking, the whole duration being fifteen to twenty minutes. Picking up may replace kneading whenever it is suitable.

The arm is then "done up" as the surgeon has directed; and the patient is instructed to move the fingers as much as possible, to exercise shoulder and elbow at regular intervals, to keep the hand in a sling so that it always



FIG. 55.—Wrong position—though very common—of supporting the forearm in a sling.

rests at a level higher than the elbow (see Figs. 53, 54, and 55), and on a pillow in a corresponding position at night. Massage without removal of splintage is quite possible and also very beneficial, even though the segment of the limb that has been injured is never touched.

Next day the process is repeated, slightly more movement is given, slight adduction and abduction being added; and the patient should be asked to contract all the

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muscles in the forearm before being done up. He is now instructed to keep all the finger-joints loose by moving them each in turn.

The third day relaxed movement should include some 75 per cent. of flexion of the wrist ; and rotation of the forearm from full pronation to mid-way between pro-



FIG. 56.—Correct position for using the rotator.

nation and supination. Should the latter cause difficulty, gentle kneading over the biceps and the pronator radii teres may solve it. The pronator quadratus might be expected to cause trouble, but its nerve supply corresponds so closely to that of the pronator radii teres that, if this relaxes, the quadratus will follow its example. Care must of course be taken to see that the biceps is relaxed. When the arm has been done up the patient is taught to approxi-

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mate the tip of each finger to that of the thumb—"to form O's"—separating them as far as possible after each approximation. This, together with "five-finger exercises," should be done once an hour for five minutes.

The fourth day all movements are slightly increased, but the fingers should receive a dose of almost, if not quite, complete movement, including lateralisation of all

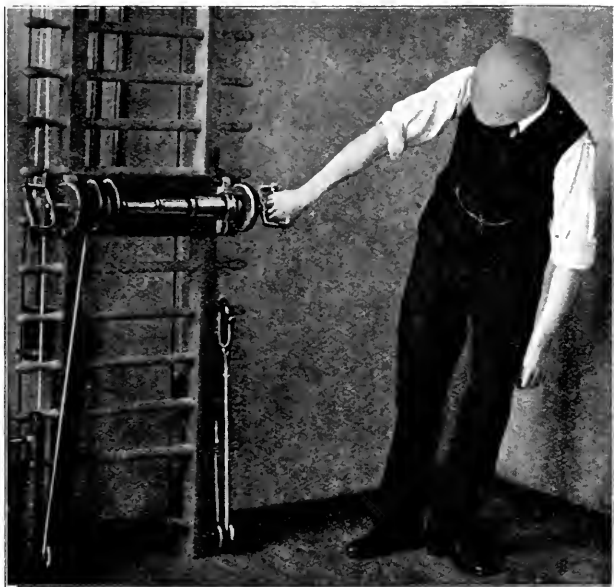


FIG. 57.—Incorrect position for using the rotator. Note that most of the movement is performed at trunk and shoulder.

interphalangeal joints in semi-flexion, and also antero-posterior movements of the heads of the metacarpals, thus moving the joints between the bases of the metacarpals and the carpo-metacarpal joints. The patient may be told to pick up a pencil and roll it between fingers and thumb, to thread large-eyed needles with thin string, and so forth.

The fifth day it may be possible to ask the patient to roll the hand to and fro on a cushion, and to raise the hand

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from a position of flexion to one of slight extension, and perhaps 50 per cent. of extension may be administered as a relaxed movement. Rotation is prescribed between the *séances* from pronation to the mid-position.

The sixth day the process is gradually increased, and on the seventh the patient may be given a pencil and told to experiment by writing his name.

And so the process goes on, day by day a little addition, till by the end of the second week full relaxed movement is possible with perhaps a few minor limitations; while the "home exercises" include doing up buttons, filling a pipe, striking matches, and feeding, but not cutting meat or the crust of bread.

During this second week, and perhaps even earlier, exercises on the roller and rotator are commenced, at first with no resistance, then with a daily increase of range in the elevation of gradually increasing weights (see Figs. 56, 57, and 58). The severity of the exercise can also be varied with the size of the "grip" used on the roller. As a late exercise the ratchet may be released when

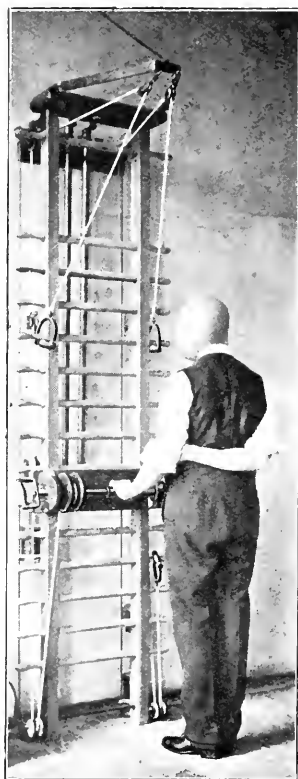


FIG. 58. Correct position for using the roller.

the weights have been wound up to the full extent. Their return to the ground is then regulated solely by the grip on the roller. The hand works in pronation on the roller at first, and only performs supination with the rotator. As soon as three weights can be raised, rolling is commenced in supination, and pronation is allowed with the

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roller—both without weights at first. These are gradually added as time goes on. A few days later a straight vertical pull on the weight and pulley apparatus may be allowed.

The fourth week perhaps it may be possible to add some gradually increasing ladder exercises (see Fig. 59), while the weight and pulley may be used in all directions. It is quite likely that the patient may have resumed any



FIG. 59.—A useful exercise for securing full extension of the wrist by the aid of the ladder. The left elbow is raised and lowered.

avocation that does not entail heavy work, but if greater strength is required exercises may be continued.

During the fourth week the patient may begin practising "putting," short approach shots with a mashie, swinging a tennis-racket, and so forth. An admirable exercise can be devised for rotation by grasping a steel poker in the middle and rolling it slowly round. The hand is moved daily towards one end; the other end is then placed vertically upwards and slowly moved to and fro.

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While rising to the vertical this is a concentric resistive exercise, while falling from the vertical it is excentric, and may be very powerful as the grasp approaches the end of the poker (see Figs. 60 and 61).

A useful exercise during the end of the second week was shown to the author by Tait Mackenzie. It consists of taking hold of the corner of a half-sheet of newspaper and gradually crushing it up into the palm of the hand



FIG. 60.—To illustrate an exercise for rotation of the forearm, showing how a poker may replace more elaborate apparatus.

till it is all rolled up into a tight ball. The process is continued until the paper is hidden from sight as far as possible by the thumb and fingers.

Piano-playing during the third week, typewriting, knitting, sewing, weeding, grass-cutting, and other non-laborious work all find their place as remedial agents.

Massage may cease as soon as the patient complains of weakness only and not of stiffness, and when full relaxed movement can be secured without its aid.

The tests as to how much a patient may be allowed to

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do are simple. If the performance of any exercise causes pain, it is subject to suspicion. If the pain passes off within half an hour of the hand and forearm being placed at rest in a sling, all is well. Otherwise that particular exercise is to be postponed for a few days. If any movement is found to be less in amplitude when the patient arrives for treatment than it was the day before, it is a sure sign of excessive use ; while any trace of increase in



FIG. 61.—To illustrate an exercise for rotation of the shoulder.

swelling renders the evidence doubly conclusive. Exercises must then be stopped completely for, say, two days, or until movement is fully restored, swelling decreased, and pain relieved. Meanwhile massage and relaxed movements are recommenced and constitute the whole of the *séance*. Exercises are resumed on a slightly milder scale.

There is an anatomical law that every joint receives the same nerve supply as the muscles that control the movements of the joint. A pathological law seems to be that injury to a joint—which involves injury to its nerve supply, or at least irritation—produces a reflex wasting

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of the muscles controlling the movement of the joint. By following out some such scheme as has been outlined, the disturbance of circulation is restored by reflex excited by the surface stroking, by the assistance to the venous circulation, and by the reflex response to mechanical stimulation of the unstriated muscle fibres of the arterioles as a result of the kneading. The improvement in the circulation assists the repair of the joint, and, by so doing, limits the reflex wasting of the muscles.

The mobilisation effectively prevents the formation of adhesions—either general matting or definite bands. It may be argued that the minute trace of movement in the early stages can have no influence on the formation or otherwise of adhesions. This is a delusion. An adhesion in the first instance consists of granulation tissue, which is nothing more or less than a collection of minute blood-vessels the walls of which are formed by a single layer of cells. If movement is performed through the smallest possible range, it is sufficient to ensure the rupture of so delicate a structure if it tends to impede the movement. On the other hand, if natural movement only is performed, and if perfect relaxation is present, no strain is exerted on any of the normal structures, and, therefore, nothing is done that can produce the effect of rupturing the granulation tissue that is being formed for their repair. This may sound theoretical to a degree that borders on the improbable, but it is the only possible explanation of the results observed clinically.

How far the mobilisation tends to secure a beneficial reflex it is difficult to say, but Aristotle undoubtedly enunciated a great truth in his axiom "movement is life," and it may play a large part. Clinically at least the sensation of movement is most pleasing to the patient, and few natural phenomena that give a sensation of pleasure are detrimental.

We see, then, that, in our treatment, we have aimed at restoring by massage any disturbance of circulation, and thereby have assisted the repair of all injured structures. We have, by massage, rendered movement pos-

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sible, and so have prevented the formation of adhesions, without interfering with repair of the injured tissues, which on the contrary, has been aided owing to the restoration of efficient circulation. In addition, the movement may in itself have helped to counteract the reflex set up by inimical stimuli.

CHAPTER XII.

THE TREATMENT OF RECENT INJURY (*continued*).

FRACTURES OF THE UPPER EXTREMITY.

HAVING now considered in detail the treatment of a concrete example of recent injury, and having examined into the *rationale* of the treatment, it only remains to amplify it in its application to other forms of injury.

Fractures are under the immediate care of the surgeon, and although treatment by massage and mobilisation is applicable to a very large number of fractures from the outset, it is still rarely prescribed in the earliest stages. To the author it has never seemed to be right for a medical man to pass on the responsibility of treatment, till union is complete. He should at least see the patient on alternate days and examine position and splintage. He will then issue instructions to his masseur day by day.

Failing these instructions, however, it is necessary to have some guiding laws of treatment such as the following :—

Until union is firm no form of massage is permissible over the injured segment of the limb, save only the gentle surface stroking. Even in performing this, the area of fracture must be omitted from the stroke. It is well to begin the stroking over an area that is not sensitive, and gradually to extend the length of the stroke till the site of the fracture is approached. The stroke may then be increased to include the area beyond the fracture, only the actual site of injury being omitted.

When union is complete there are various danger-signals which must always be regarded. Any increase in tenderness at the site of the fracture is an indication for

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the cessation of mobilisation and should be reported immediately. It indicates irritability of the callus due to yielding of the union. An increase in swelling means that treatment the previous day has been excessive. The same deduction may be made if movement is more restricted or if there is an increase in stiffness. Massage is to be continued; mobilisation reduced or omitted. Sudden onset of pain with swelling may be due to thrombosis; it should be reported at once, and no treatment should be administered till further orders are given. The patient's life may depend on this precaution. No one could be



FIG. 62.—Position for treating a fractured clavicle with the patient supine. Note that full movement to the elbow and all joints below can be given without disturbing the site of fracture. The patient's forearm rests on that of the masseur, as shown in Fig. 63.

blamed for omitting treatment on the barest suspicion of this calamity: to overlook the symptoms is unpardonable. In addition to pain and swelling there may be a rise in temperature. The patient usually describes the pain as resembling cramp, and tenderness can be noted along a line in the long axis of the limb. If a superficial vein is implicated there will be redness, but probably there will be none if the vein lies deep.

Great care must be taken adequately to support the ends of the broken bones. A rough idea as to how this may be effected can be given shortly; the detail requires alteration to suit the needs of each individual case.

It must be remembered that in administering a dose

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of mobilisation there is always one direction in which movement can be applied that will tend to displace the fragments more than movement in other directions ; while it is usual to find that in one direction at least movement has no tendency to cause displacement. This movement is, of course, the first to be administered and prescribed respectively during the performance of relaxed or active movement. Similarly any movement that tends to displacement is postponed until union is firm.

Fractures of the clavicle, if the fragments are not liable to slip, may be treated while the patient sits with the elbow supported on a cushion. If there is any danger of displacement the patient should be supine, with head low, elbow supported by the side, and hand resting on the body (see Fig. 62). Massage should deal with the neck and pectorals before the limb is touched, but the whole limb needs treatment. Movement of hand and wrist, elbow and rotation, may all be given freely from the outset. Movement of the shoulder may be commenced very slowly and gently from the start if the fragments do not tend to shift ; if they are mobile it should be postponed for a week or ten days, and then it should be commenced very cautiously. Unless strapped, the patient should be allowed to move hand and wrist freely from the outset. A simple fracture of clavicle never fails to unite, but undue mobilisation causes an excessive formation of callus.

Fracture of the outer or of the inner third rarely leads to deformity, and treatment can therefore be advanced more rapidly. It is often possible to allow full "underhand" use from the outset. It is always necessary to pay special attention to the structures just above the bone ; as, failing this, it is not uncommon for a piece of platysma to be caught between the fragments. This is a fertile source of subsequent pain and disability, as some fibres of the superficial cervical plexus are almost certainly involved. It can be loosened only by very slow stages and with great difficulty.

A *fracture of the upper third of the humerus* may be

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impacted. Here, as elsewhere, impaction should often be respected by the surgeon; and, if this is done, the impaction may be regarded as the first stage in repair and the limb treated as if union had just taken place. Unimpacted fractures in this situation, if treated by mobilisation and massage, usually unite about the eighth



FIG. 63.—To show the position of patient during massage after a recent fracture through any portion of the upper two-thirds of the humerus. The weight of the limb acts as an extension. Note that the whole of the neck, chest, and back can be treated without change of position. The arm has been rotated from the position in which it rests when supported by a sling. This represents a later stage in treatment than that referred to in the text.

day. The patient should always be treated sitting up, preferably on a chair, which is so arranged that he leans the opposite side of the chest on the back of the chair, supports the arm on the top of the chair-back, and rests his head on his hand. The hand of the injured arm rests in a sling or on a cushion, which is placed on the knee of the same side, this being crossed over the opposite knee

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(see Fig. 63). Massage is carried out as for fracture of the clavicle, but a greater area of the back should be treated so as to include the latissimus dorsi. Mobilisation is required as for fracture of the clavicle, particular attention being paid to the hand movements. It is well, unless the surgeon orders otherwise, for the patient to sleep in an armchair or lounge cane chair with the feet up, and not in bed. If he sleeps in bed, treatment should be given

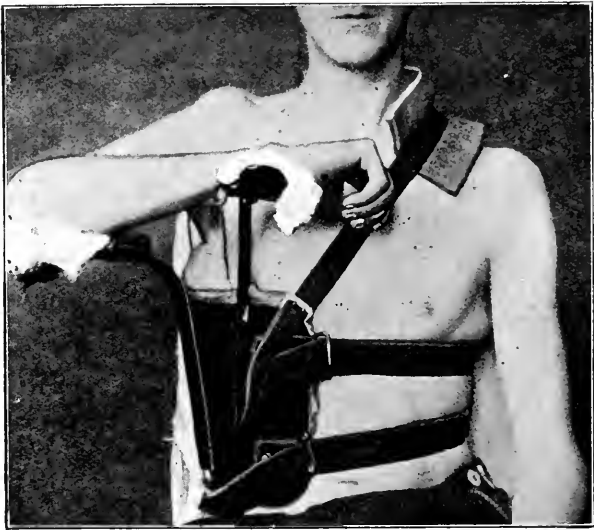


FIG. 64.—To show abduction splint applied.

in this position. No movement should be given to the shoulder for eight or ten days unless specially ordered, and then all other movements should precede rotation. If ordered, slight movements, in every direction excluding rotation, may be given from the outset provided the limb receives adequate support. Championnière used to say that, thanks to mobilisation, fracture of the surgical neck of the humerus might be classed as a trivial injury. Weight and pulley exercises may be commenced in a fortnight and full use be allowed during the fourth week. Full strength should be regained about the eighth week.

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If the fracture includes *separation of the greater tuberosity*, it occasionally happens that the callus formed, or even the tuberosity itself, may impinge on the acromion during abduction. The evidence consists of sharp pain just below the acromion during passive abduction. If this is noted, the surgeon should be warned so that he may have the opportunity of placing the patient on an abduction splint (see Fig. 64), in which union is allowed to take place. This ensures that there will be little interference with the movement of abduction. For some reason or other, these fractures are always more painful than those in which the shaft of the bone only is involved.

Fractures through the middle of the shaft of the bone take a little longer to unite—about ten or twelve days. It is easier to give movement to the shoulder after this accident than if the surgical neck is broken, but elbow movements must be much more carefully guarded.

The great danger of *fractures round the elbow-joint*, with the exception of olecranon fractures, is the subsequent formation of an excess of callus. In children this particularly applies, and all these fractures are best left alone to nature and splintage unless the danger is fully appreciated. Then, and then only, can mobilisation and massage help. The mobilisation of shoulder, wrist, and hand may be freely given. If, however, mobilisation and massage are ordered from the outset, movement may be administered to the elbow with advantage, but only if two rules are scrupulously obeyed. The first is that massage throughout the early stages should be limited to the easing of pain, and the second that mobilisation for the first three weeks must consist only of relaxed movements given very sparingly. In children this will mean that massage is reduced almost to zero from the second or third day; in adults it will require a longer dose at each sitting, and it may be necessary to continue massage for two or three weeks. After the first week in an adult case, it may be of advantage to commence gentle kneading for the œdema, but great care must be taken to avoid the area of injury and to proceed

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so gently that not a trace of movement takes place between the fragments. The limb will almost certainly be kept in a position that is a shade short of full flexion. It is meant to be in full flexion, but this is a very painfully cramped position and is equally difficult to secure permanently. Taking the position in which the limb is fixed as about 30° , the angle is increased by about 10° and then decreased again to the original 30° . This movement is performed once, and of course only after complete relaxation has been secured. Next day perhaps an extra 5° of extension is performed once only, and by the end of the week the angle to which the limb is extended should only reach about 60° . By the end of the next week it may perhaps reach 150° , and during the following week full extension may be given except for the last few degrees of movement. It is probable that the elbow will not be completely straightened till the end of the fourth week, or even later. It may prove necessary to apply a straight splint before the last few degrees of extension are secured. The patient may be allowed to assist flexion from the end of the second week, and to perform it voluntarily some time during the third week of treatment. Throughout the treatment of these injuries a careful watch must be kept for any increase of pain or of sensitiveness. In the event of either being detected, the indication is that the callus is "irritable," and it should therefore be regarded as an absolute contra-indication to further mobilisation until it is relieved. A more gradual increase in the range of movement is then undertaken.

If surgeons would only recognise the importance of bearing in mind the existence of the "carrying angle," when reducing fractures of the lower end of the humerus, many a patient would escape permanent deformity.

Except in cases of fracture of the head of the radius, rotation may be commenced early, pronation being added to the extension from about the end of the first week, with supination to assist the restoration of flexion. If the head of the radius is involved, rotation must be performed very tentatively. For no very apparent reason these fractures

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tend to throw out an excess of callus more readily than perhaps any other fracture in the body, not even excluding fracture of the ribs and the so called separation of the lower epiphysis of the humerus. Rotation is a comparatively small movement, and if we secure 25 per cent. by the end of the first week, 50 per cent. by the end of the second, and 75 per cent. by the end of the third week progress will have erred on the side of recklessness. And



FIG. 65.—To illustrate the application of one type of "cuff and collar." The straps passing over the shoulder are shortened day by day as flexion increases. Full flexion is maintained till the patient can, after loosening the straps, raise his forearm to the full extent without pain. Then the "cuff" is allowed to drop a little each day.

for this reason: no guide—absolutely none—will serve to show the gravity of the situation until the damage is done. Everything may seem to be going on splendidly for about eighteen days, then the patient may begin to complain of pain, and, do what we may, another week will see a heartrending reduction in movement, which may lead to permanent loss of mobility and power. Absolute rest and hot-air baths for three to six weeks will, however, occasionally avert complete disaster. The

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cases in which this excess of callus is most usually seen are those in which faulty diagnosis has been made. The patient has a fall, is shaken up, has some pain in his elbow (not a great deal), does his work, goes to bed and then has a bad night. Next morning there is some swelling, a medical man is consulted, movement is found to be a little painful but perfect, and there is no crepitus. Diagnosis of "sprain" is made. Hot fomentations or



FIG. 66.—To show flexion by a sling.

a liniment "to be well rubbed in" are ordered, and the patient is often advised "to keep the elbow from getting stiff." It is swollen, so he expects some pain, and it is only when he finds that the pain persists that he seeks advice again. Even the movement involved in the changing of fomentations is enough to cause an enormous outpouring of callus, so it is easy to imagine the parlous state of many of these patients. If the patient has used the arm at all after the accident, or if fomentations or

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“rubbing” have been advised, there is only one safe treatment—absolute rest in flexion and hot-air baths from the outset (see Figs. 65, 66, and 67). The fixation prevents the further dissemination of osteogenetic cells, the flexion ensures that any ossification that may follow will not impede flexion, while the heat causes a local hyperæmia which tends to hasten the absorption of exudate, and so reduces the amount of pathological material in which ossification can take place.



FIG. 67.—To show how flexion may be relaxed.

It is plain, then, that the task of the masseur when asked to treat a fracture near the elbow-joint is one of great difficulty. The main laws are “go slow” and never multiply movements till the end of the third week. It has been said above that, if trouble is arising, no guide will show the gravity of the situation till it is too late. There are, however, three symptoms which, if they arise, unerringly indicate that something is wrong—good fortune may furnish one or more. These are increase in pain, decrease in mobility, tenderness near the site of

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fracture. Last, but by no means of least importance, the absence of local œdema may be regarded as an assurance that no great risk is being run, while its presence should fill us with suspicion. Local œdema in front of the elbow, if present, usually indicates blood-clot. If the newly-forming callus is irritated, the whole of this clot will ossify, and if, as often happens, it should run into the interstices formed by rupture or tearing of muscle fibres, it will lead to a condition closely resembling myositis ossificans—usually in the brachialis anticus. If there is no local œdema there cannot be any large amount of extravasated blood, and hence ossification outside the bone, even if it does take place, is not likely to be excessive. Let us beware then of local œdema.

There is one form of fracture of the humerus near the elbow, after which no fear of excessive callus formation need be entertained. This is a T-shaped fracture into the joint. The synovial fluid, it would seem, inhibits the growth of callus; and, unless mobilisation is administered with a somewhat free hand, it is no uncommon event to find non-union as a sequel to the accident. The mobilisation tends to counteract the inhibitory action of the synovial fluid.

One more pitfall. It is difficult to explain how an elbow can be dislocated backwards without fracture being coincident. It appears, however, that it is possible. Even without dislocation, and even if radiography can produce no evidence of fracture, any severe injury near the elbow is liable to produce an outpouring of callus from somewhere, or, if not of true callus, of a deposit which develops into new bone. Treatment of these injuries should therefore be very cautious.

Fractures of the olecranon may be complete or incomplete. In the latter case the untorn periosteum will form an efficient splint, strengthened as it is by fibres from the insertion of the triceps. Nothing need be feared from the bony injury, and so the only condition that calls for treatment is the arthritis of the elbow-joint. This may be treated on lines similar to those sketched out for treatment of a

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fracture through the lowest inch of the radius without displacement. Roughly speaking, massage for the relief of pain—superficial stroking only—is given to restore the tone of the vaso-motor system of the limb and to relieve spasm. Full relaxed movements of hand, wrist, and shoulder are given, and some 30 per cent. of elbow movement. Free active movements of hand and shoulder are prescribed, provided that movement of the elbow is limited. Relaxed and active movements proceed regularly day by day, guided in extent by the amount that can be performed without pain.

If the fracture is complete, and the smaller fragment of the olecranon is drawn up by the spasm of the triceps, few surgeons can be found who would recommend massage from the outset. Lucas-Championnière, who was the first surgeon to operate on these fractures in France, gradually came to the conclusion that the results attainable by mobilisation and massage were so superior to those following operation that he abandoned the latter altogether in favour of the former. A few cases are still recommended for massage from the outset for patients who are unsuited temperamentally or physically for operation; and an excellent result may be assured provided that the worker and the patient fully appreciate one fact. Union will not be sufficiently firm to support any serious degree of tension for four weeks. Therefore, during this period, anything that pertains to the nature of “over-hand” movement must be prohibited. With this reservation the treatment may be conducted on somewhat free lines. From the outset the aim of the worker should be to secure by gradual stages relaxed movement from 90° to 170° . After ten days or so, the sole guide being the painless nature of the movement, any “under-hand” use of the hand may be encouraged. After this stage has been reached flexion may be increased till the movement is complete about the end of the third week. As no “over-hand” movement is to be performed for so long a time, great care must be taken to retain the suppleness of the shoulder and the strength of the deltoid.

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Fractures of one bone of the forearm present, as a rule, little difficulty. Union of the lower end of the radius or of the upper third of the ulna is usually firm enough to allow great freedom of relaxed movement in eight or ten

days, and active movement may almost always be indulged in with ever-increasing freedom from the end of the fortnight, provided it is painless and no swelling or tenderness follows use.

As the site of fracture ascends the radius or descends the ulna the time required for union to take place increases steadily, till a maximum is reached for the lowest inch of the ulna, where a fracture frequently requires some three weeks to unite.

Fractures of both bones of the forearm are the *bête noir* of all methods of treatment. After operation they frequently fail to unite, the same fate often awaits the use of ordinary splintage, while treatment by mobilisation is sometimes not much more satisfactory. Certain it is that great risk is involved by those who are unfortunate enough to sustain this injury. Until union is complete in *both* bones the main function of the masseur is to attend to the circulation of the arm, and to see that the fingers remain supple. Massage of the forearm should only be applied with the anterior splint *in situ*. One of the most efficient



FIG. 68.—To show the application of long anterior and posterior forearm splints.

methods of applying splintage is to fix one splint from shoulder to finger-tips posteriorly and another from wrist to shoulder anteriorly (see Fig. 68). In applying the splints it is essential to note that the "carrying angle" is maintained. This entails the use of a very broad posterior splint. The patient must remain in bed with the

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limb elevated on a pillow. This method of splintage produces an appearance in the limb that would seem to be deplorable, and the restoration of movement is very troublesome unless performed in one way. Commence with slight pronation of the forearm, and flexion of the elbow follows naturally: attempt flexion without this preliminary, and endless trouble will ensue. In treatment of these fractures it is more essential perhaps than in any other case, medical or surgical, to insist that the whole responsibility should rest on the medical man.



FIG. 69.—To show the method of reducing a Colles fracture practised by Robert Jones. By this means it is possible to reduce deformity a very considerable time after fracture has taken place.

A very full account has been given in the previous chapter of the treatment applicable to a simple *fracture through the lowest inch of the radius* without displacement. If there is displacement, or if it has been present and has been reduced, treatment must follow the same lines, but progress should be somewhat slower at the outset. The vital importance of reduction of gross deformity is frequently overlooked. The best way to effect it is shown in Fig. 69. Whenever possible impaction should be respected, and regarded as the first stage in repair. Impaction and severe displacement rarely occur simul-

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taneously. In these cases pain over the styloid process of the ulna will be a source of great trouble to patient and worker alike, so local treatment of the internal lateral ligament should always find a very definite place in the *séance* from the first, even though the patient may not complain of pain there for some time after the commencement of treatment. Local kneading and friction are called for, and it is important that these should be administered in every position from full pronation through



FIG. 70.—To show the administration of local treatment to the internal lateral ligament of the wrist-joint.

all the stages of supination as they are day by day secured (see Fig. 70).

Fractures of the carpus with displacement must be dealt with by the surgeon: after operation, or if there is no displacement, treatment should follow the lines laid down for fractures through the lowest inch of the radius.

Fractures in the hand call for treatment on general lines. The long bones of the hand are concave on their palmar surface, and therefore flat splints with full extension of the fingers tend to produce a palmar convexity at the site of fracture. If surgeons would recognise this fact, many hours of labour would be saved for the massage-worker, and many hands would be perfectly sound which are

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now doomed to permanent incapacity, of greater or less degree, despite endless work in the massage departments of our military hospitals. A pad of wool or dressing about the size of an ordinary tennis-ball forms an efficient splint. It need not be spherical—the “ tennis-ball ” in fact should not be fully inflated. It may be well to emphasise that for fractures involving the hand, no less than for similar injuries in other portions of the limb, massage to improve the circulation is one of the chief agents by which repair may be hastened, and therefore that treatment of the arm is just as important as treatment nearer the site of fracture.

CHAPTER XIII.

THE TREATMENT OF RECENT INJURY (*continued*).

FRACTURES OF THE LOWER EXTREMITY.

Fractures of the Neck of the Femur.—When speaking of elderly patients who have sustained an impacted fracture of the neck of the femur, Lucas-Championnière was always emphatic that more people die as the result of treatment by immobilisation than of the injury. When undertaking treatment by mobilisation and massage it is essential to remember that, if the patient is one of advancing years, the reflex arc is very soon and very easily tired. Hence massage must be reduced, as in children, to a minimum; while mobilisation takes a part in the treatment of these fractures that nothing can replace. It is surprising to find how much movement can be administered, after a few minutes of gentle stroking, to a limb that is apparently absolutely fixed and rigid. The relief of the movement is very great: it indicates the subsidence of cramp and its accompanying pain. It is usual for these fractures to be impacted, and the following account is based on the assumption that impaction has taken place.

Massage commences with surface stroking from hip to foot. In a few minutes the free hand will find that the toes can be moved without pain, a little later the ankle begins to move, and as soon as this has received a fairly full dose of mobilisation attention may be given to the knee. The disengaged hand is placed under the knee and the most gentle attempt is made to elevate it and to let it fall again every time the massaging hand passes over it. No movement will take place at first, but before long it will commence. As soon as it has been raised sufficiently a pillow is placed beneath the knee, and then flexion and extension may be performed by supporting

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the ankle (see Fig. 71). In ten minutes or so foot, ankle, and knee may have been mobilised freely, and this of necessity entails some movement of the hip. If all has gone well so far, the hand under the ankle may now raise the leg, and support is given as shown in Fig. 35, p. 77. All movements of the hip should now be performed slowly and carefully, care being taken never to roll the foot inwards, as this movement invariably causes pain. In fact, the patient is unlikely ever again to be able to rotate the foot inwards, owing to the external rotation of the shaft in its relation to the head of the bone. The limb is next placed at rest, very slightly bent over a cushion, and



FIG. 71.—To show another method of mobilising the knee during the early stages. The right hand of the masseur alternately raises and lowers the foot.

the patient is instructed to attempt various movements of the trunk, commencing with raising the shoulders and gentle turning movements. Any pain that these may cause may be relieved in a few moments by massage. Following this routine it should be possible to sit the patient up in bed for short intervals on the second day and to get her—the accident usually occurs in women—on to a chair or couch (keeping the limb horizontal) on the third day. The foot may be allowed to hang down in a week, and it is possible to plan a multitude of simple devices to encourage the full restoration of the movements. Some patients can walk immediately after the accident—it is not uncommon for them to do so, as the intensity of the pain is lost for the moment in the shock of the

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accident—and it is not till later that their real suffering commences. Thus the patient may be encouraged to stand on the sound leg and swing the injured limb gently to and fro. Next she places the foot on the ground and gradually increases the pressure on the foot, till, once more, she can walk.

If there is no impaction, splintage or extension is required, and then no one but the surgeon should administer movement to any part of the limb except to the toes and ankle. It is true that shortening due to spasm can be reduced under the influence of massage, but the surgeon alone should undertake this part of the treatment. Hence only stroking of the whole limb and movement of toes should be performed during the early stages. The ankle may be moved if the appliance permits. No other massage movement should be given (unless ordered by the surgeon) till union is complete. In septic compound fractures union is often delayed, callus formation is sluggish, circulation very faulty, and œdema equally intense. Great benefit can be bestowed in these cases by kneading. Every movement will tend to shake the fragments, and it is necessary, therefore, that great care and gentleness should be exercised, and that any pressure exerted, however slight, should find something to counteract it on the other side of the limb. If necessary this must be one of the masseur's hands. Granted these requisites, the movement of the fragments will stimulate the callus and hasten recovery ; excess will delay and even prevent union.

The same remarks apply to all *fractures of the femur below the neck*. Any movement must be left to the surgeon, though it were well if, in recent fractures, he would always try the effect of mobilisation under the influence of massage before deciding on open operation for the reduction of deformity. When union is complete and the patient is handed over to the masseur for restoration of function, the first attempts at movement should always be performed so as to ensure that no strain falls upon the site of fracture. At first any strain exerted should be in the line of the long axis of the limb, lateral strain being

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added by very slow stages. A Thomas' knee-splint is the most suitable splint on which the limb can be put up if we wish to apply massage to any case of fracture of the shaft of the femur.

The remarks made on the inhibitory action of synovial fluid on callus formation, after fractures of the humerus into the elbow-joint, apply with equal force to those involving the knee-joint. Early mobilisation is advantageous, and only requires the most careful graduation.

After any *fracture of the leg*, massage of the thigh can be used to restore the vaso-motor tone by reflex, and to assist the circulation by its mechanical effect and by toning up the muscles of the arterioles. Hence great benefit can be bestowed, although the leg itself may be fixed in plaster. If massage is ordered after *fracture of the fibula* above its lower third, the treatment may proceed without fear of displacement. Surface stroking of the whole limb is followed by general massage of the thigh, and movement is given to all joints, with the exception of eversion of the foot. Graduation must be carefully supervised by the surgeon till union, which often takes place rapidly, is complete.

The same remarks apply to *fracture of the tibia alone*, but movements must be much more guarded, varying from comparative freedom, corresponding to that usually applicable to fracture of the fibula, to the almost negative amount that it is possible to apply if both bones are broken. The only guide is to be found in the amount of tearing of the natural internal splint—the periosteum—and this can only be estimated by the mobility of the fragments, which in turn is indicated by the amount of displacement after accident. If there was little displacement, the graduation may be rapid; if great, mobilisation must be reduced accordingly.

If the *shafts of both bones* are broken, great care must be exercised in the earlier stages. Until union is complete the splint must be one that is easily removable without disturbing the fracture. This means that it is either in two or three pieces. In the former instance one side of the splint case alone must be removed at a time, and the

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limb should be stroked gently while the other half of the case remains *in situ*. If the limb rests on a posterior splint, the two lateral splints may be removed simultaneously, care being taken to see that the foot is maintained in its original position throughout treatment. Hence the importance of the grip of the left hand as shown in Figs. 5, 6, and 7, pp. 28—30. Stroking of the whole limb may be given first, then the splints are fastened, gentle kneading of the thigh follows, and the treatment terminates with movement of the toes. When union is complete—it is more rapid towards the upper end of the tibia than towards the lower—knee and hip movements may be commenced gradually, though great care must be taken to avoid any transverse strain being placed on the site of fracture. The limb is then placed at rest and the ankle is mobilised separately. At the earliest opportunity the patient is allowed to swing the leg over the side of the bed, and re-education in walking is commenced (see Chapter XVIII.). This should be about five days after union is complete, *i.e.*, probably during the third week.

After *fracture in the region of the ankle-joint* treatment by mobilisation and massage is often of the greatest possible service. After *fracture of the lower end of the fibula*, assuming immediate treatment is called for, the first point is to see that kneading is performed over the external lateral ligament with sufficient firmness to arrest hæmorrhage if this is obviously progressing, and to remove any effusion that may have already taken place. A thick pad of wool is then applied, and the whole is tightly bandaged. If, however, treatment commences at a later date, surface stroking massage should be commenced from about the middle of the calf to the hip (or *vice versâ*) and the region of the ankle is gradually approached. Presently the stroke begins on the dorsum of the foot, it skips the ankle region, and then is continued up the limb. Any area of local swelling over the external lateral ligament is next subjected to firm kneading to try to dissipate local effusion. Care must be taken to avoid the site of fracture. In any case local treatment is called for over the ligament, unless

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there is some definite contra-indication. All movements, minute in amplitude at first, are administered to all joints of the foot and to the ankle with the exception of eversion. The second day deep stroking and compression massage of the thigh, and perhaps of the calf, may be added ; and the third day the patient may hang the foot down and commence to "waggle" it about gently at the end of treatment. As soon as all swelling has disappeared—usually about the eighth day—exercises without weight and general re-education may be commenced.

Treatment for *fracture of the internal malleolus* should follow similar lines. This fracture is one which is commonly stated to fail to unite. This is probably due to the escape of synovial fluid between the fragments, and mobilisation affords us a potent weapon wherewith to counteract this tendency. Eversion may, of course, be given or prescribed ; but inversion must be prohibited till union has taken place. This requires a few days more than does union of the external malleolus, and so exercises must be correspondingly postponed.

If *both bones are broken*, or if there has been dislocation of the foot combined with fracture of one or both of the bones, treatment is much more difficult. The surgeon must reduce the deformity and arrange some fixation apparatus. Massage of the thigh can, none the less, aid repair by acting on the circulation and the nervous mechanism. When the splints are removed, care must be taken always to maintain inversion of the foot until union is quite sound, *i.e.*, for a fortnight at least.

If a patient is found in a box-splint without a vertical foot-piece, then let the masseur beware. There is no more potent cause of thrombosis in the posterior tibial vein than the omission of the foot-piece. A glance at Fig. 1 will show that, if the foot is allowed to drop, the calf muscles flatten out and the vein must accordingly be obliterate (see p. 16).

Fractures of the tarsal bones are serious injuries, and are often the prelude to osteo-arthritis in the joints. The patient is then in a parlous state. Treatment by mobili-

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sation and massage tends to avert this evil; but the administration of movement is often impracticable during the early stages.

Fractures of the metatarsals, accidental or operative—as for instance, after operation for hallux rigidus or valgus, when the bone has been completely divided—always



FIG. 72.—To show a useful grip for mobilisation of the tarsal and tarso-metatarsal joints. Kneading the foot without allowing the hands to slip over the surface of the skin may be performed in the same position.

provide a certain anxiety for the masseur. The severity of the injury varies, fracture of the first metatarsal being the most injurious, that of the fifth being least so. Mobilisation after massage must be given with all possible freedom to all the joints where movement does not involve any danger of displacing the fragments (see Fig. 72). When these are united, in about three weeks, all that remains is re-education in walking, which is preceded by free movement of all the joints of the limb.

Fractures of the patella are of two varieties—the stellate and the transverse. In the former the periosteum, with its strengthening fibres derived from the quadriceps and patellar ligament, is not ruptured and acts as a most efficient splint. Treatment should therefore be on the

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lines of a recent injury to the knee-joint. If the fracture is complete and the fragments are widely separated, treatment by mobilisation and massage cannot quickly ensure any excellent result. Lucas-Championnière advised that in all these fractures the fragments should be united by suture. Plates are not so satisfactory, as they do not permit of any moulding or subsequent adaptation of the fragments. Then, if the shape of the bone is not perfect, refracture is almost a certainty. Robert Jones in his "Injuries to Joints" records that admirable results follow the use of the walking calliper for this accident. Massage could assist to maintain the nutrition of the limb and thus hasten repair, while mobilisation could be administered without fear of stretching the fibrous union, at least from a point half-way through the period that the instrument must be worn, which is about two months.

Efficient re-education of walking is a very special art, and is invariably required to a greater or less extent after all fractures of the lower limb (see Chapter XVIII.).

Before leaving the subject of fractures it is necessary to utter a word of warning. Not every masseur is a fit person to be entrusted with the responsibility of treating a recent injury. If fracture is present, only those who have received special teaching and training in the art should be asked to deal with it, and, even then, great care and discrimination are called for in selecting a masseur for a difficult case. Experience alone is inadequate in the absence of the necessary skill and temperament. To hand over a case of recent fracture to a masseur merely because he happens to be proficient in other branches of his work is to court disaster. The responsibility for failure belongs to the medical man who selected the masseur, so it is his duty to be sure that the latter is qualified—by training, experience, skill, and temperament—for his highly specialised and very responsible duty. For the treatment of recent injury is an art apart.

CHAPTER XIV.

THE TREATMENT OF RECENT INJURY (*continued*).

SPRAINS AND DISLOCATIONS.

A DISLOCATION, once it has been reduced, is only a severe form of sprain. The historical treatment of these injuries is prolonged rest with absolute fixation. This treatment ignores two facts. First, that to repair injury done an efficient blood supply is essential: by absolute rest the circulation in the part is reduced to a minimum, and this is all the more pernicious on account of the vaso-motor disturbance due to the injury. Second, in all these injuries one or more joints have suffered, and the muscles which control the movement of the joints undergo a rapid wasting, due to a reflex set up in the joint which derives its nerve supply from the same source as do the muscles. By immobilisation nothing is done to counteract this wasting. Of recent years there has been a marked tendency to reduce the period of immobilisation considerably, and it is now no uncommon event for a case of dislocation to be recommended for mobilisation and massage from the outset.

The treatment of recent sprains and dislocations is very similar to that prescribed for any case of fracture in the vicinity, the only differences being that special muscle groups usually call for extra attention in devising treatment, and that treatment can progress more rapidly.

After dislocation there is always spasm of the muscles controlling the joint. This is a reflex attempt on the part of the muscles to prevent the bone slipping any further. In other words, it is nature's method of attempting to secure the immobilisation of a structure which is no longer in its normal position. Once the dislocation is reduced the need for this protective reflex is diminished, being

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now only necessary in so far as it is called for to prevent undue movement in a joint, which is suffering from a very severe traumatic arthritis. Thus the dislocation, when reduced, amounts to nothing more than a sprain of sufficient severity to tear one or more ligaments.

The masseur will never be called upon to treat a case of dislocation until it is reduced. Many medical men would be surprised at the ease with which some dislocations can be reduced almost spontaneously after massage has been performed for only a few minutes. This particularly applies to dislocations of the shoulder.

The general indications for treatment will be plain from what has been said in the previous chapters, and all that is necessary is a short recapitulation.

For the relief of pain and of such spasm as may be present (after reduction in the case of dislocations, or after the ordinary manipulation performed for diagnostic purposes in the event of sprains) surface stroking is the one thing needful. The limb must be maintained in a position of perfect ease and comfort, and therefore in one which does not tend to recurrence of dislocation, or to the stretching of any ligaments that may have been injured.

The stroking also tends to counteract any inimical stimuli set up by the injury, and so helps to restore the vaso-motor tone and to prevent muscle wasting. How far these two results are interdependent it is impossible to say.

Deep stroking may be used at once as a further aid to the circulation, and any form of compression massage may be added for local treatment, wherever it seems to be indicated as an aid to the removal of local effusion before it has had time to organise. It will be remembered that this is the first care of the worker if immediate treatment of a sprain is demanded, and then it is given with the additional motive in stopping hæmorrhage from any vessel that may have been torn. The kneading in this event is to be followed by pressure by means of a *thick* pad of wool and a bandage, before the remaining treatment is undertaken.

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Mobilisation of all joints in the limb that have not sustained injury may be freely administered from the outset, and all active movements that do not tend to lay any stress on the injured joint may be prescribed.

Dislocations of the *clavicle*, fortunately rare, are easy to reduce, but it is excessively difficult to maintain the reduction. Thus no movement must be administered or allowed to any part of the limb above the elbow until explicit instructions are given.¹ Massage should include the whole of the neck, the pectoral and scapular regions in turn, and the whole of the upper limb. If the sternoclavicular joint has suffered, particular attention should be paid to the region around the origin of the sternomastoid and the pectoralis major. This should take the form of kneading. If the acromial joint has been dislocated, the area round the origin of the deltoid calls for this attention. Free movement may be given to the elbow and all joints distal to it. Active movements should be prescribed for rotation of the forearm, for the wrist, and for all the joints of the hand. When movement of the injured joint is prescribed, treatment may proceed as if the injury had been only a sprain, but mobilisation must proceed rather more gradually. Sprains of the clavicular joints are rare ; if treatment is ordered it should proceed as for dislocations, but movement may also be administered to the shoulder. This must be limited in the earlier stages to elevating the arm to a position just under the horizontal. Shrugging of the shoulders may be commenced in about three days, and then the elevation of the arm may proceed by slow stages. Ordinary underhand use of the arm may be allowed from the outset ; the pectoralis major and the deltoid call for special care in devising exercises.

Enforced rest after *dislocation of the shoulder* is a fertile source of recurrence. The stability of the joint depends on muscular control, and, if the muscles are allowed to waste, instability is inevitable. Moreover, there is no

¹ Many surgeons elect to disregard the deformity. In this event mobilisation should proceed apace.

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reason why dislocation should recur when it is once reduced, provided no undue strain is placed upon the joint, and therefore massage may be commenced at once, and mobilisation may be meted out with a free hand as soon as the pain and spasm have been allayed. The only movement to avoid in the early stages is that of abduction. It is safer to administer movement freely during the first week after dislocation, than during the fifth if the joint has been immobilised. Exercises should be administered to strengthen the pectoralis major, subscapularis, and the two spinati rotators. All under-hand movements may be allowed from the outset; overhead movement should not be given for a fortnight.

One form of "sprain" of the shoulder calls for special mention. It is the so-called "stubbed shoulder." This is seen occasionally as a sequel to Colles' fracture and also as the result of a fall on the point of the shoulder. The nature of the injury is that the head of the humerus is driven with violence against the glenoid. The articular cartilage lining the latter is injured and, being avascular, it can be repaired only by vessels creeping in from the periphery. This corresponds to the phenomena witnessed after contusion of the cornea. It is a process that takes time, and it is only when the injured patch becomes vascularised that pain of any severity is noticed. This occurs usually about three weeks after accident. The temptation is to regard the shoulder injury as one of such long standing that movement should be forcibly restored. It may even be attempted under an anæsthetic. The result is invariably disappointing, as, instead of hastening recovery, it must inevitably bruise and injure the delicate vessels that nature has formed to hasten repair. The only treatment is absolute rest for about three weeks, though massage for the rest of the limb will maintain its nutrition and mobility. It may be asked, "How is a masseuse to be expected to know this condition and to avoid doing injury?" The answer is simple. Here, as in all other cases of injury, no harm will arise if the golden laws of treatment are observed: first, that any relaxed movement

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may be administered only if it is painless ; second, if range of movement one day is less than the previous day, too much movement has been given and the dose therefore must be reduced ; third, any increase of pain on voluntary movement, or any increasing loss of mobility, are contra-indications to the continuation of mobilisation. Respect for these laws means that no injury will be done ; neglect invites catastrophe. The answer to our question then is this : there is no need for a masseuse to be a diagnostician ; she should know and recognise danger-signals, and should not be afraid to admit having done too much one day and to reduce the dose accordingly. It is no part of her responsibility to decide *what* has happened ; that is the surgeon's work : her duty is to report to him in the event of untoward symptoms being noticed.

One of the dangers encountered in treating *dislocation of the elbow* has already been dealt with when considering fractures round the elbow-joint (see p. 131). It was then told how, in the absence of all apparent injury to bone, there is a tendency to the outpouring of a vast formation of new bone. Massage to restore vaso-motor balance and to assist the absorption of swelling should be given, but movement must be very guarded in the presence of local swelling which may indicate blood-clot. There is another danger. The injury is severe, all the structures in front of the joint are severely torn, and therefore have to be repaired. This is done by the formation of granulation tissue. If this is broken down again when once it is formed, not only does blood escape from the torn vessels of which it consists—thus producing the source of danger we have already seen must be avoided—but a stimulus is given to the formation of more granulation tissue. No matter how much is laid down it will in the end organise into fibrous tissue. If there is no excess, this will serve only to repair the damaged structures ; if it is excessive, adhesions will also form. Suppose, then, that treatment is conducted in the fully-flexed position, there would seem to be two alternatives : first, to perform no movement, in which case it is certain that the bands which effect the

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repair will be too short to allow movement in the future, or, second, to administer movement and chance doing so to excess. It is essential, therefore, to know what can be done with safety. Obedience to the laws just recapitulated will avert disaster, but here it is wise to state once more, in addition, that relaxed movement must be performed to its full limit once and once only, no matter how small the range may be. Turning the patient's forearm into a sort of pump-handle is absolutely prohibited, and it is only when the range of movement to be performed has considerably increased that to and fro movement through the sub-maximal range is permissible. All sprains of the elbow should be treated cautiously and on lines similar to those advocated for fracture near the elbow, or for dislocation. As the gravity of the injury is obviously less severe, treatment may be advanced with corresponding rapidity, but the main laws of treatment must be regarded scrupulously.

Dislocation of the wrist or of any individual bone of the carpus is always a severe injury. If the wrist has suffered, all that has been said on the subject of fracture through the lowest inch of the radius holds good as indicating the line of treatment to be followed. It is not a common injury, and, after reduction, the surgeon will probably have placed the wrist in a slightly dorsi-flexed position. If so, the formation of disabling adhesions is not likely to occur (Robert Jones) and restoration of function should be rapid.

If one or more *bones of the carpus* have been dislocated, treatment should aim at restoring dorsi-flexion. This law should be respected in the massage-room as well as in the operating theatre during the treatment of all injuries of wrist and carpus below the level of the lower end of the radius. If this position is not secured, and if the dislocation is left unreduced, months of massage and manipulation will probably effect only a very partial restoration of function. Any attempt to hasten the process will render it more prolonged. Otherwise treatment may proceed on the general lines mapped out for Colles' fracture (see p. 112). If any offending fragment has been

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removed by operation, treatment is the same, but will be found to be capable of much more rapid progress.

A detailed account has been given (p. 112) of treatment applicable to fracture without displacement through the lowest inch of the radius. This will furnish a full guide for treatment of a sprained wrist. Most severe "sprains" in this situation will be discovered to be fissure fractures on examination with the X-rays, the most common being a separation of the radial styloid process.

All injuries in the hand may be treated on general lines. Dislocations are very liable to recurrence, and so active movement must be prescribed cautiously. Massage to hasten repair must be applied to the whole limb, or at least to the level of the elbow. All movements of shoulder and elbow should be prescribed freely to encourage circulation and prevent stiffness.

Dislocations of the hip are not very liable to recur in the massage-room. The injury is very severe, and the surgeon invariably prescribes treatment. General massage for reflex effect and for circulation are called for; the patient should be taught to exercise all muscles, and internal rotation is the last movement that should be administered or prescribed.

Sprains of the hip are very rare, as fracture or dislocation takes place instead. If met with they should be treated on general lines.

Dislocations of the knee never arrive in the massage department while the injury is still recent. Sprains, cases of "water on the knee" from various causes, and "slipped cartilage" cases that have been reduced, are frequently recommended for treatment by mobilisation and massage.

In the treatment of all cases of injury to the knee two points must be kept in mind—first, that the injured structure must be guarded from strain while repair takes place, and, second, that the quadriceps extensor will waste as a whole, but that the lower fibres of the vastus internus will do so more rapidly and more thoroughly than the rest of the group. The result of this is that, when the

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quadriceps contracts as a whole, the patella will be drawn up somewhat obliquely to the natural line of movement. Thus, in Fig. 73, if A is the line of pull of all the muscles except the vastus internus, B is that of the vastus internus, and C the resultant of these two forces, C will represent

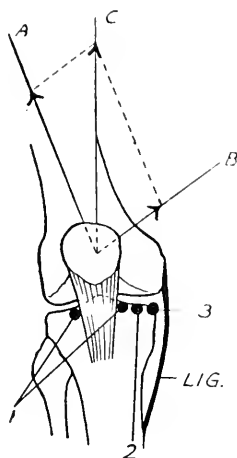


FIG. 73.—(After Robert Jones.) To show how wasting of the vastus internus alters the resultant of the pull of the whole quadriceps, thus causing the movement of the patella to deviate from its normal direction.

A, line of pull of the quadriceps as a whole.

B, line of pull of the lower fibres of the vastus internus.

C, resultant line of movement of the patella.

1. Tenderness at these points on extension indicates a tender post-patellar pad.

2. Tenderness indicates injury to anterior portion of the internal semilunar cartilage.

3. Usual point of tenderness after strain of the internal lateral ligament.

L.I.G. indicates the position of the longest fibres of the internal lateral ligament.

the normal line of movement of the patella. It is obvious that any diminution of the force B will tend to shift the resultant C nearer to A. In addition the lateral fixation of the knee is insecure, and a certain amount of preternatural mobility is possible. The clinical effect is recurrent effusion. Hence the importance that must always be

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attached to building up the strength of these fibres of the vastus internus. This may be effected in three ways. During normal extension of the leg the vastus internus contracts in proportion to the other muscles, but in forcible extension it seems to play a more prominent part. Hence the patient should be instructed to "try to bend the knee backwards" both lying and standing. The second exercise is merely a special application of this method, namely, tip-toe walking with knees stiff. The third is performed from the fundamental standing position, the knee is slightly slackened, and an attempt is made to rotate the knee inwards. This requires practice, but is very effective.

If the internal lateral ligament has been torn, or if, in addition, the internal semilunar cartilage has slipped, treatment should follow on usual lines; but it should be noted that the internal lateral ligament has broad attachment both above and below, the deep fibres being comparatively short and the superficial longer (see Fig. 73, Lig.). Local treatment should therefore be directed to a wide area, extending from a considerable distance above the lower end of the condyle of the femur to the shaft of the tibia. The third exercise mentioned above must be omitted.

After massage for reflex effect, to remove spasm, to assist the circulation, and for hastening the absorption of local effusion, relaxed movement should be administered with the usual precautions; but particular care should be taken not to allow any tendency of the tibia to separate from the inner condyle of the femur. In other words, no "gaping" must be allowed on the inner side. The safest position to conduct treatment is to rest the limb on the worker's lap (see Figs. 32 and 33). The one test of successful treatment is the progressive absorption of fluid. If it is noticed to have increased one day, or even if it is found not to have decreased, then treatment has been excessive. As soon as relaxed movement to a right angle has been reached, exercises without weight may be commenced (see p. 193). Whether the sole and heel of the boot are built up on the inner side or not, the

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patient must be instructed to walk correctly, fair heel and toe, to keep the toes straight, and to throw all weight on the outer side of the foot.

In all recent knee injuries special care must be taken that relaxed movements are absolutely painless, are very minute in amplitude at the outset, and that the leg is never treated as a pump-handle. From the outset the patient should be taught to exercise the quadriceps, even though the limb is fixed on a back-splint and no movement is allowed.

A common cause of "water on the knee" is the nipping of the retro-patellar pad of fat. In this case forcible extension must be avoided, as pain over the position shown in Fig. 73 (I), on extension, is the sign by which we recognise the condition. It is due to the "nipping," and every care must be taken to avoid repetition of the accident. This injunction should be unnecessary if the laws for administering mobilisation are adhered to, as any movement administered must be painless. Some, however, seem to think that because extension is painful it is therefore their duty to work away at it. It is in reality the ideal way to prolong and augment the evil they are trying to cure.

Dislocations of the ankle are almost always fracture-dislocations. As regards their treatment, nothing further need be added to what has been said on the subject of fractures near the ankle-joint (see p. 146). The great dread that should always be present in the mind of anyone treating these injuries is the subsequent development of flat-foot. Exercises for the muscles that help support the arch should therefore be given and prescribed from the outset. Re-education in walking should always occupy a prominent position in the treatment of these cases.

The same applies when treating all *sprains of the foot*, and treatment should follow exactly the course mapped out for a sprained ankle. Massage should include at least the whole of the leg, and also of the thigh if the injury is severe. The subsequent re-education in walking is, of course, all-important.

CHAPTER XV.

THE TREATMENT OF RECENT INJURY (*continued*).

TORN MUSCLES ; BRUISES ; POST-OPERATION TREATMENT.

THE *treatment of torn muscles* by mobilisation and massage resembles very largely that applicable to torn ligaments. The position of these accidents is usually at or near the bony origin or attachment of the muscle. The muscle or its tendon may not be actually torn ; the injury may be to the periosteal insertion. Muscle fibres may, of course, be torn anywhere. Examples of injury to the periosteum, or to the muscle near its insertion to the bone, are found in the so-called "tennis" and "golf elbows." One form of "golf shoulder" is due to rupture of some fibres in the deltoid. Granulation tissue for repair is formed and is broken down the next time the muscle contracts violently. More granulation tissue forms and again is broken down. Soon some nerve fibres become involved, the pain gets worse, and use is restricted. The granulation tissue then becomes organised and an adhesion is formed, perhaps with the involvement of the nerve fibres. Wasting soon follows, and the patient is left with a chronic incapacity for his favourite game. His general health suffers and a serious cycle of events is started. The "tennis-leg" is said to be caused by tearing of the plantaris tendon. The patient usually imagines that he has been hit on the back of the leg by his partner. Rupture of any fibres in the calf muscles may be the cause of the pain.

The immediate treatment is to check effusion, or, if effusion has taken place, to disperse it before it has had time to organise. The importance of this procedure is seen after subcutaneous section of the plantar fascia in the treatment of a pes cavus. If hæmorrhage is arrested

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by pressure, the patient is rarely if ever conscious of any discomfort in the sole ; if pressure has been inefficiently applied, there may be a tender lump in the sole that will cripple the patient for weeks, or it may be even for months.

Having checked effusion locally, it is necessary to counter any vaso-motor reflex disturbance, and treatment for the first day ceases.

Next day there is little fear of recurrence of hæmorrhage provided the muscle is not allowed to contract. All the other muscles in the limb may be exercised, and relaxed movement through minute amplitude may be given, in the direction which is normally controlled by the injured muscle. Local treatment should be given to any area where there is local swelling or œdema, but it must be so administered that there is no danger of loosening any clot that seals the mouth of a torn vessel. This entails pressure of an even character, slowly and gently applied, and the most suitable treatment is gentle kneading with the ball of the thumb or palm of the hand. This should follow the administration of general massage to produce reflex effect and to promote circulation throughout the limb. It is wise to maintain pressure with wool and a bandage to ensure that there is no increase in local effusion. Nothing will hasten the wasting of a muscle more effectively than separating it from its attachment. Hence the desirability of commencing its function of contraction with as little delay as possible after any portion has been torn. Herein lies a difficulty : contraction is essential ; strain is most detrimental. By performing relaxed movements a muscle can be made to shorten and elongate to a certain extent, but this is not enough entirely to prevent wasting. A patient can usually be taught to contract and relax a muscle without placing any strain upon it, and if he will perform this " exercise " faithfully much may be achieved. Mr. W. R. Bristow uses, with admirable success, a means whereby this end can be attained without the co-operation of the patient. He uses a faradic current of low voltage, the strength being regulated by

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manipulation of a metal core, which is alternately pushed into and withdrawn from the hollow in the secondary coil. In this way a graduated contraction is produced which, to quote one instance only amongst many, aids in the restoration of a victim to a rider's strain more rapidly and completely than can any amount of perseverance on the part of the patient or his masseur.

Not only is contraction essential to the maintenance of muscular strength, but, after rupture of muscular fibres, it is essential to prevent the formation of adhesions. Once any muscle, or even any group of fibres within a muscle, becomes adherent to an adjacent group, trouble is sure to follow, and the stretching of the adhesions may be a prolonged and tedious process. It can be effected by the prescription of suitable exercises, but here again contraction in response to electrical stimulation will succeed far more rapidly, in most cases, than if voluntary contraction is relied upon alone. A combination of both is, of course, the ideal.

The amount of strain that can be placed with safety on a muscle that has suffered injury must depend upon the extent of the injury. The labourer who " strains " the muscles of his forearm slightly puts on a leather wristlet, which acts as a sort of block to his movement. He then goes on with his work. Often this suffices, and Robert Jones has applied the principle further, and " straps " the deltoid near its insertion, the quadriceps above the patella and the leg muscles above the ankle, when these muscles have sustained injury. Some use of the injured muscle is therefore not only to be allowed but is actually beneficial, and the masseur can often render great assistance by using one hand to replace the " wristlet " of the labourer. To decide how much movement to give or how much use to prescribe we are driven back to the golden rule of all treatment of recent injury, that movement, active or passive, must be painless. To ensure this the movements must be slow and the contraction must be performed rhythmically, not only as regards the sequence of movements, but also as regards the actual

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contraction during each several movement. In other words, there must be no spasmodic or irregular twitching.

Perhaps the most troublesome form of muscle injury is that which befalls the erector spinæ or one of the small muscles in the back. The trouble is not that the injury is necessarily severe, but because, if treatment is not immediate and efficient, pain may prove most intractable and severe. There seems to be a strong tendency for a neurotic element to creep in, and then the patient's condition is truly lamentable. Firm kneading to prevent effusion, or to disperse it if formed, should constitute immediate treatment ; and mobilisation, which of necessity must be chiefly active, should be prescribed with as little delay as possible.

If a tendon is severely torn so that few fibres only remain intact, the surgeon will be wise if he fixes the joints concerned during the period of repair. If massage is ordered, no movement of any joint should be allowed which cannot be controlled by the patient to the extent of fully restoring the position from which the movement started. Otherwise repair may be impeded.

Sometimes the *deep fascia* over a muscle is torn and the muscle fibres tend to protrude through the rent during contraction—a hernia of muscle. This is a trivial accident, but may cause much discomfort, and the “ lump ” may produce a marked psychological effect. Recovery depends on the repair of the sheath, and, if repair has commenced, it may be completely undone by a single contraction while the orifice is not guarded. Thus no contraction of the muscle must be allowed unless a hand or bandage is placed over the whole area of injury. This precaution taken, mobilisation may be administered and prescribed with a free hand.

It is not very often that the masseur is asked to deal with a *simple bruise*, yet the relief that can be given by skilled massage is immense and the period of discomfort can be greatly shortened. Treatment should be given as for a severe sprain: surface stroking (avoiding the injured area at first and gradually encroaching on it later)

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is succeeded by deep stroking, and this in turn by local kneading. The kneading is best performed by placing the whole palm of the hand firmly over the site of injury, and then by imparting a circular movement to the hand. Surface stroking terminates the *séance*.

If a *nerve* is injured, (the ulnar nerve frequently suffers from bruises), treatment follows on similar lines ; but care must be taken to avoid any movement or pressure that causes pain. One of the dangers of treatment is that pain can be greatly relieved, and the temptation to do more and give prolonged local treatment may be great. Such treatment is a mistake ; and a frequent result is that some two or three hours later the patient is worse off than if he had never been treated. Other nerve injuries will be dealt with in a subsequent chapter (see Chapter XXI.).

Post-operative treatment must be considered, from the massage point of view, as entirely different to the treatment of other recent injuries. The difference is this : the surgeon is almost certain to issue definite instructions as to what he wishes to be done. Hence little need be said here, save to insist once more that all massage movements must be slow, gentle, rhythmical, and devoid of pain while any form of mobilisation must equally be painless.

Operation scars of recent date must always be treated with respect ; and care must be taken not to tear the granulation tissue which holds the edges of the wound together. Hence all movements of massage should tend to press the edges towards each other ; and if any movement performed during the mobilisation tends to drag them apart, the granulation tissue must be adequately supported in maintaining juxtaposition. A scar is not organised completely for about three weeks.

It not infrequently happens that a surgeon breaks down adhesions in a joint and then orders massage and mobilisation to commence forthwith. It is preposterous that such orders should be given without informing the masseur as to the amount of movement that was secured under the anæsthetic, and as to the amount of difficulty experienced. Yet this often happens, and the masseur

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is left to judge as best he may as to the extent of "injury" inflicted by the operation. The amount of pain and the difficulty in relieving it are fair guides. Surgeons usually expect any movement which has been performed under the anæsthetic, to be performed at the first massage *séance* after operation. This is doubtless ideal but is not often easy, particularly if the surgeon has made a mistake and done more than was desirable. Also it is most difficult to know exactly when to "break down a joint," or even to judge what joints should or should not be treated in this manner. The ideal method of ensuring satisfactory after-treatment would be for the masseur to be present at the operation, and it should always be arranged if possible. If this prove to be impracticable, then undoubtedly explicit instructions should be given, and if "full movement" is ordered it must be given. Should it cause great pain, the fact must be reported before the movement is repeated. The best plan for all concerned is to aim at securing on the third day the full range of movement that was performed under the anæsthetic. If, after prolonged massage and patient attempts to secure this result, it becomes obvious that movement is more limited than before the operation, we may be sure that something is wrong—either that the operation should not have been performed or that too much has been attempted.

After any such operation it is almost impossible to adhere too strictly to the rule of painless movement, and therefore some guide is necessary as to the amount of pain that it is permissible to inflict. A good working law is that if pain can be relieved by massage all is well; if pain ceases within half an hour of the limb being placed at rest no deleterious result need be feared. If, on the other hand, pain is persistent, if swelling or synovitis do not rapidly subside, or if there is any increase in the difficulty of securing movement, or of pain during movement, then too much is being attempted.

One word of warning is needed about the treatment of limbs after a bone has been plated. There is a tendency

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to believe that the plate will act so efficiently as an internal splint that no disturbance of the fragments need be feared. This is a most dangerous delusion. After all plating operations no less care should be exerted to avoid placing any lateral strain on the site of fracture than if the plate were not present. At operation the screws doubtless "bite" firmly; but this entails pressure on the bone, and in a few days the "bite" is far less firm than at first. Strain at the site of fracture may then serve to loosen the screws and prejudice the whole success of the operation.

In all post-operative treatment, massage should aim at relieving pain and restoring circulation. Mobilisation should aim at teaching the muscles to contract, whether movement is possible or not.

If massage is ordered while a wound is still septic, special precautions are necessary. The author recalls the case of a nurse who developed blood-poisoning as the result of a prick on her thumb while doing district maternity work. Massage was commenced while there were still six drainage tubes in the limb, the top one being in the axilla. Not only did the application of massage save many doses of morphia, but complete use was restored to hand and arm except for the interphalangeal joint of the thumb. In so severe a case nothing but surface stroking is permissible, and mobilisation must be painless. The presence of sepsis is no contra-indication, if this law is respected.

When the sepsis is localised the case is simplified, but this very fact enhances the danger in one direction. If a knee-joint, for example, is septic and massage is ordered, it is right and proper that surface stroking should be succeeded by massage to aid the circulation. A wide berth must, however, be given to the area of sepsis, otherwise there will be great danger of breaking off an embolus in one of the veins. It is true that any area where thrombosis is present is tender to the touch, and so if the massage is painless there is really little risk. But the patient is sure to be in discomfort and probably in pain, and the slight additional pain due to gentle massage may be

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accepted without complaint or even with actual relief. "It is a pleasant sort of ache," the patient may say. If no sepsis is present, this "pleasant pain" may be disregarded; but in the presence of sepsis it must be regarded as a serious danger-signal.

Throughout this book treatment by exercises receives for the most part but scant notice—so, too, must treatment by electrical methods. It is not intended to belittle the value of either, but each requires such special consideration that a book on massage cannot be made to cover the ground.

Short reference must, however, be made to the use of electricity in the treatment of injury, and particularly to the treatment known as "Graduated Contraction."¹ Its value is seen in four directions. First, it provides a means of preventing muscular wasting after injury, and, second, of exercising a muscle without moving the joints upon which it acts. Third, it enables us to exercise any individual muscle which happens to have suffered injury out of proportion to that sustained by its synergists, and an example has been given when referring to rider's strain. Fourth, it affords a means of exercising any muscle, which may have wasted to such an extent that the power of voluntary contraction is too poor to allow the patient to re-develop it by exercise with reasonable rapidity. The wasting of the quadriceps after injury provides a dual example. Not infrequently the muscle is so wasted that, if its re-development is left to the patient's own efforts, recovery is likely to be tedious and prolonged. Also, unless the power of voluntary contraction is well maintained, it is a most difficult task to exercise the lower fibres of the vastus internus as suggested on p. 158. It is in cases of this type that treatment by graduated contraction finds its *métier*.

¹For a full account of this method of treatment see "Treatment of Joint and Muscle Injuries," by W. Rowley Bristow, Oxford Medical Publications.

CHAPTER XVI.

THE TREATMENT OF THE AFTER-EFFECTS OF INJURY.

WHEN some little time has passed since the receipt of injury the condition depends entirely on the previous treatment. The points that will now require attention are circulatory troubles, scars, stiffness of joints, adhesions, and the loss of muscular power.

It will save repetition if it is stated at once that the presence or absence of sepsis is all-important as regards prognosis. If sepsis has been present there *should* be always before us the danger of lighting up a process that has become quiescent. The result of our recent experiences in military surgery has emphasised the fact that no operation of an orthopædic character should be undertaken for at least four months after the final closing of a septic wound. The masseur should keep this in mind. Many of the limbs we are now called upon to treat, in order better to fit the discharged soldier for civilian employment, are in a parlous state. Months of perseverance can only improve them and nothing can really cure. But patience can work wonders, while haste will often give rise to the most unpleasant of surprises by causing infection in a limb to flare up in a most disconcerting manner. Apart from the consequences to the patient, it is heart-breaking to see the labour of months thrown away as the result of a fit of impatience on the part of the masseur.

In the absence of sepsis an excess of zeal will not only cause pain, it may cause synovitis, and will assuredly delay recovery. If long continued, irremediable harm may be inflicted ; but this should be confined to those cases where lack of clinical experience and insufficiency of training are the root of the evil. Many reports of various

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catastrophes have reached the author since the outbreak of war, and it is for this reason that he has made the present attempt to try to supply a substitute, inadequate though it must be, for clinical experience where this is lacking. One thing in particular has tended to militate against the success of the massage treatment of the wounded, namely, the attempt to treat more cases in a limited time than can be accomplished with efficiency. Reduction of the time devoted to treatment tends to increase its severity, and herein lie potentialities for much evil. If overworked, the law for the masseur should be—give inadequate treatment and trust to the patient's own efforts more than would usually be deemed desirable, but do not attempt to compress half an hour's treatment into fifteen minutes.

In order to aid the circulation every agent at our disposal must be invoked ; but now, as in more recent stages, surface stroking should begin and end the *séance*. The stroking becomes more and more firm by very slow and gradual stages. The rhythm is maintained throughout. Some form of compression massage follows, commencing if possible above the level of œdema (if present) and gradually working downwards. A constant return to the parts already treated must be made as each new segment of the limb is reached. The use of a mechanical vibrator is often helpful, but should not be continued for more than two or three minutes at a time over one spot, as if continued too long it is apt to paralyse the unstriped muscle fibres of the arterioles. It is useless to devote less than twenty minutes to an attempt to render efficient assistance to the circulation of a limb when œdema is present. Half an hour is none too long. The massage need not, however, be consecutive, as it may, with advantage, be interrupted for short spells of active mobilisation. The passive part of the treatment should, of course, be undertaken during the continuance of the massage.

The treatment of scars is a special art in itself, and some workers seem to be endowed by nature with special adaptability for this branch of work.

A recent scar must, as was stated in the previous

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chapter, be treated with respect. For three weeks no movement may be performed which tends to separate the healing surfaces, and then only if repair has been carried out in the presence of asepsis.

If a granulating surface is not yet healed, much may be done to hasten the process of repair by general massage of the whole limb (or of a wide area if the trunk is involved). Local kneading around the scar, say with the two thumbs, will help to revitalise the area involved. Gentle hand vibration of the tissues around is also useful. This treatment is of special value when a scar has failed to heal for some time and is, in effect, an indolent ulcer. An attempt should be made during the kneading to loosen the edges of the healing scar by pressure from a distance towards its centre, or by lateralising the skin and subcutaneous tissues *en bloc* on the surface of the underlying muscles, which, for this purpose, should be kept in a state of contraction.

Once a scar has been healed for more than four weeks, or, if it is very extensive, even before it has completely healed, the "older" parts of the scar will be avascular. However superficial it may appear to be, it is surprising how deeply the ramifications may penetrate. Thus it never suffices to deal superficially with any obvious surface injury; it must always be considered as involving deeper structures until the contrary is proved. The question can be solved by rendering the skin and underlying structures as lax as possible and then by lateralising the whole area involved. Not infrequently a scar, which has no appearance of being adherent, will be found to dimple at one or more points, indicating the presence of some deep adhesion. Unless this is loosened first, any attempt to benefit the patient will be wasted. The first law in treatment should therefore be to relax the part to the uttermost, and then to lateralise all structures under the scar as freely as possible. This may be done by gripping the tissues on either side of the scar between fingers and thumb, or between the two thumbs or other parts of the hands. It is best to deal with these troublesome injuries by a

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process of slow and gradual stretching, and this can be effected by deep-stroking massage (usually employing the two thumbs), the pressure being exerted laterally. The stroke need not be a long one, and it should be performed so that the second thumb is exerting tension on the tissues before that exerted by the leading thumb has relaxed appreciably. If the pads of the thumbs do not afford a sufficient surface, the balls of the thumbs, or even the whole surface of the palms of the hands, may be used instead. When the process has continued for two or three minutes it may be reversed, and the pressure should then be exerted from the opposite side of the scar.

In this way the deepest ramifications are dealt with. The part is then placed in a position in which the underlying tissues are not quite so relaxed, and the process is repeated. This helps to loosen the less deep strands, while, when the structures are put in full tension, only the most superficial part of the scar is being dealt with.

A vibrator can often be used with good effect in loosening superficial scars, but only in rare cases should it be applied to the scar itself. It should be applied round the periphery, and should always be used so as to exert a lateralising effect on the scar.

Some masseurs prefer to use oil when dealing with scars. In massage for other conditions this is a question of personal habitude, but in the treatment of scars it is often to the patient's advantage that it should be used. The scaly appearance of some scars can be greatly improved by using oil, but this is only a superficial effect. How the use of oil can benefit scar tissue is a matter for pathological speculation, which, to be in accord with clinical facts, runs somewhat as follows:—Scar tissue is avascular and consists of fibrous tissue. The oil penetrates the superficial parts and insinuates itself between the fibres, which then form a kind of sheath around the oily globules. Thus the fibres are converted into the cell-wall of a fat-cell, and so the fibrous tissue becomes transformed from a pathological formation into a normal tissue. We know

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that a weakling baby can absorb oil through the skin and derive nourishment therefrom. Hence we are justified in assuming that the oil can be conveyed from the surface through these artificially made " fat-cells " to the deeper parts of the scar. Suppleness is thus restored, and the substitution of normal tissue for pathological fibrous bands takes place.

Great skill is required in dealing with even the most insensitive of scars, and a patient will often do better if the whole treatment is performed in hot water. The *eau courante*, or whirlpool, bath has been greatly extolled in this connection since it was installed at the Grand Palais in Paris, and has become very fashionable in this country. The hot-air bath had a great reputation in the treatment of scars, but efficient massage seems to receive little or no assistance from it. Massage in a bath of hot water or under the hot tap only renders manipulation of a painful scar less difficult, and the *eau courante* bath tends still further to minimise the difficulty of dealing with a sensitive scar. The only possible explanation of the benefit to be derived from the swirl of water is that some beneficial reflex is set up. Experience has yet to prove that this can be excited more efficiently by the swirl of the water than by massage. Its advocates do not wish to supplant massage by its use, but only to use it as an adjunct.

If massage treatment is crude, or if the main laws of massage treatment are disregarded, this bath will be found of inestimable service ; if massage treatment is efficient, its use will prove a valuable accessory.

Robert Jones has devised a scheme for encouraging what he calls " gymnastics of the arterioles," which consists of contrast bathing, the limb being plunged alternately into hot and cold baths. It is not a pleasant treatment, but the patient soon accustoms himself to it, and there are cases where it has seemed greatly to assist progress.

The whole idea of all these treatments is to secure beneficial effect through the vascular supply of the limb,

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and the repair of scar tissue requires an efficient supply of blood no less than do other reparative processes. General vaso-dilatation due to heat does not seem to meet the requirements, although as a preliminary to exercise of a stiff limb it may help considerably. Anyone, who is stiff after a long day "cross-country" and takes a hot bath, will bear testimony to this fact. Massage, however, succeeds far better, and the danger of the use of heat baths is that it may serve to cloak inefficiency in massage. But for the end in view, the vascularisation of a local area, no forms of heat treatment can hope to compete with ionisation. Here it is probable that the benefit is derived from the hyperæmia produced and not from the action of any particular ion.

One lesson at least may be learnt from the advocacy of hot air, hot water, and the *eau courante*, namely, that to mete out to a scar treatment that is purely local is inefficient. The whole of a limb, or at the very least the whole of a segment of a limb, should receive attention before any attempt is made at purely local treatment. Moreover, the massage used should consist of the stroking for surface reflex first, then general treatment to aid circulation, and finally local treatment.

If a nerve is caught in a scar, the benefit to be derived from massage is always problematical. Three methods of attack seem to be of service. The first should always be used, namely, surface stroking, followed by deep stroking. Gentle kneading of the area around the scar should follow, provided no pain is felt during the manipulations. As sensitiveness decreases the painful area is gradually approached. The second device is to place the palm of the hand firmly over the sensitive area and impart to it a circular movement, using the hand as a sort of millstone—the *mouvement en meule* of Lucas-Championnière. It often happens that a surface, which the patient cannot bear to be touched in any other way, can be freely manipulated thus. The third method is the use of a mechanical vibrator—a small hand machine run by electricity being almost essential. A "brush-pad"

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should be used, and it should be applied freely to those areas round the scar in which sensation is normal. The painful area is then gradually approached. How the vibration acts is not very clear, but remarkable results may sometimes be noted. The most probable explanation is that the shaking is sufficiently severe to loosen all small peri-neuritic adhesions, but of insufficient amplitude to cause pain. Moreover, as the vibrations are transmitted from a distance during the early stages, any stretching that takes place must be performed by very gradual stages. If there are three ways in which a painful scar may be treated, there is one in which it should not, namely, by any process of pulling or pushing directly applied to it, or of pressure over any selected portion.

If a joint is stiff the massage may be used as an agent in restoring mobility. The limb is supported in a position which corresponds to that adopted during the administration of relaxed movement, but with the difference that the support is withdrawn from the stiff joint so as to allow a certain amount of strain to fall upon it. Massage is then continued in such a manner as to add slightly to this strain, and each addition of movement is controlled by the other hand. The hand that performs the massage can detect any tendency to spasm on the part of the muscles controlling the movement, and can then deal with it by firm stroking, kneading, or shaking,¹ as may seem most desirable. If this does not suffice to secure relaxation, the other hand can release some of the tension.

The first step in the movement of a joint, which is not perfectly supple, is to discover, if this is not already known, how much free movement is possible, and how far, owing to anatomical alterations in the part, it may or may not be practicable to restore full movement. The latter information can be gained only from the medical man, as the prognosis depends almost entirely on the knowledge of what has already happened. The administration of

¹ For the description of "shaking" see p. 60. It differs somewhat from the Swedish movement described by the same name.

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a dose of relaxed movement should always precede any attempt forcibly to move a joint, and sub-maximal movement may be repeated with ever-growing amplitude till the limit of free movement is reached. Then should begin slow, steady pressure aided by massage, every bit of "slack," as it is secured by the hand which is performing the massage, being, as it were, "taken up" by the hand which is controlling the support.

The use of mechanical agencies may also be invoked, as for instance the sliding seat when attempting to add flexion to the knee (see Fig. 42, p. 91). In the same way, the weight and pulley apparatus, or the ladder, can be utilised to assist the restoration of almost any movement, both hands of the worker being then at liberty for massage, or to assist in the movement, as may be most desirable (see Fig. 74).

The administration of prolonged traction or pressure will do far more to restore a few extra degrees of flexion, than any number of sudden jabs, unless freedom of movement is almost perfect. In this case, namely, when the patient has practically recovered from the point of view of mobility, intermittent pressure may often replace the constant pressure here advocated, but it is a great mistake to allow it to do so in the earlier stages. Almost up to



FIG. 74.—To show one method of assisting movement while the patient is exercising on the ladder. The masseur is assisting extension of the elbow.



[[FIG. 75.—To show first position when trying to secure the last few degrees of supination.



FIG. 76.—To show the second position when trying to secure the last few degrees of supination.

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the end of treatment sub-maximal relaxed movements may be repeated, but not the forced movements.

As examples of the beneficial effect of the repetition of forced movement may be cited the restoration of the last few degrees of supination of the forearm or extension of the knee. It is not uncommon to find that supination is complete when the elbow is fully flexed and somewhat deficient when it is extended. Supination is commenced with the forearm lying across the chest as if in a sling, it is increased as the elbow is flexed, and then



FIG. 77.—To show the final position when trying to secure the last few degrees of supination. The passage from the position shown in Fig. 56 to that here depicted should be rapid.

it is maintained in this position while the elbow is rapidly extended (see Figs. 75, 76, and 77).

Exercises for extension of the knee may consist of standing, sliding-seat, or ladder exercises. The knee is extended with all the rapidity of which patient and worker alike are capable. These and similar manœuvres should only be attempted when the amount of unrestored movement is very minute. If attempted in the earlier stages disaster in some form or other is almost certain to follow.

When a joint is practically rigid, or when movement is limited by what seems clinically to be a solid block

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from any cause, nothing but prolonged tension or pressure will effect a cure. This may be supplied by splintage or by the use of a sling, with a measure of success that is quite unattainable by massage or manipulation, for the simple reason that the force thus supplied is constantly acting throughout the twenty-four hours, instead of being applied for, at the outside, a forty-eighth part of that time.

One point always to bear in mind is that a joint may appear to be stiff simply because the muscles controlling it are wasted. It is no uncommon thing to find abduction of the arm limited to the amount that can be effected by rotation of the scapula, owing to inability on the part of the deltoid to assist in the movement. Restore the strength of the deltoid, re-educate it to contract, and full movement of the shoulder may follow without difficulty.

The treatment of adhesions has already been dealt with under different headings. Here all that is necessary is shortly to recapitulate. Adhesions are composed of connective tissue, either the white fibrous or yellow elastic. The former are usually articular or peri-articular, and should be broken down by the surgeon whenever possible. The latter are to be found in any extensive scar formation, and may be peri-articular. It is probably rare for this form of tissue to develop within a joint unless infection has been pronounced. Then the formation may be so marked that a fibrous ankylosis is present. Yellow elastic tissue calls for slow gradual stretching; sudden strain will fail to secure benefit and may serve only to irritate.

If attached to bone, no tension must be laid upon an adhesion until its bony attachment has been freed. There seems to be a sort of latent instinct in scar tissue which tells it that it is serving a definite purpose. If the tissue is attached to bone, this purpose is to inhibit movement, and, the more effectively to attain this end, it responds by development to the stimulation produced by any attempt to force movement. Thus the more we try to stretch it by movement the stronger it becomes. The first principle,

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therefore, in treating an adhesion with a bony attachment is to free it from the bone by manipulation, meantime limiting the movement of the part to such an extent that no strain whatever is placed upon the adhesion.

The principle of enforcing rest in the treatment of scar tissue is not fully appreciated. Many scars that fail to respond to massage treatment will loosen out materially if the whole part is kept at rest in a plaster splint. Thereby we may learn two principles in treatment : first, to beware of irritating any scars or adhesions, particularly if they

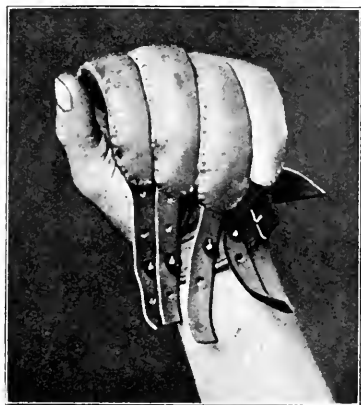


FIG. 78.—To show flexion of fingers by constant tension, the hand being placed in a glove.

are attached to bone ; second, never to be reluctant to admit that a scar is not loosening properly, as there is an alternative treatment, viz., absolute rest in plaster. Needless to say, this does not apply to scars which have not yet healed, and it should be regarded as an exceptional measure rather than be used as routine. The loss of muscular power and the means for its restoration are dealt with in the following chapter.

There are four types of case in which fixation may prove beneficial. If the distal ramifications of a scar are still vascular, manipulation may tend to act as a counter-irritant and so set up a chronic hyperæmia, which ends

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in the formation of yet more scar tissue. Enforced rest allows devascularisation to take place, and loosening is then a comparatively simple matter. There is no way in which the sources of trouble mentioned can be detected, except the failure of treatment to produce the improvement expected. Fixation should not be prolonged.

The second type of scar that may benefit from fixation is that in which, let us say, a wound has involved the



FIG. 79.—To show flexion of elbow being secured by use of the "cuff and collar." This shows how the elbow can be fully flexed and supination secured.

whole of the dorsum of the foot and skin, fasciæ, and tendons are bound down in a single rigid mass to the metatarsals. Massage treatment is tedious, and often unproductive, whereas after a period of fixation the toes may begin to move of themselves. In other words, the tendons have succeeded in "pulling through" the scar. Massage can then materially hasten the restoration of function.

The third type of scar for which fixation may be given

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a trial is that which follows an extensive wound of the muscles. It appears as a deep sulcus on the surface, and movement of the muscles is a source of pain. If the muscles are placed at rest they waste, and then it may prove a comparatively simple matter to build up, as it were, scar and muscle together. Explanation is difficult, but the fact is undeniable.

The last type of scar that benefits by fixation is that which involves the joints or the peri-articular structures. The fixation is accompanied by constant tension, as when we try to straighten an elbow, finger, or knee on a splint, to flex the fingers by means of a glove (see Fig. 78), or the elbow by using the "cuff and collar" method devised by Robert Jones (see Figs. 65, p. 133, and 79).

CHAPTER XVII.

THE RE-EDUCATION OF MUSCLE.

ORDINARY physical fitness in a muscle is maintained by numerous small contractions and not by violent effort. The latter, if scientifically utilised, can further develop a particular muscle, and can also add to the bulk and strength of any individual muscle group. It is a rare event in daily life to contract the hamstrings to their full extent, and yet their strength and vitality are maintained by the constant contractions and relaxations of small amplitude which they perform in the ordinary process of walking. This illustrates a law of nature which must always be kept in mind when attempting to restore the strength of a weakened muscle.

If a muscle is called upon to perform the full movement of a joint when its power is inadequate to accomplish it, not only will it fail in the attempt, but it will also suffer so severely from fatigue that its efforts in the immediate future will be still further limited. Let us suppose that a patient with a weak deltoid can just raise the extended arm to the horizontal. The performance is gone through with great struggles; and, when completed, the arm drops to the side and prolonged rest is required. If a second attempt is made immediately, the muscle executes a few spasmodic twitches, the arm is elevated only a few degrees and falls helpless to the side again. But if, instead of being told to move the joint through its full range, the patient is instructed to perform the movement up to, say, 15° short of the horizontal, it is probable that it will be carried out five or six times without strain or any need for subsequent rest. It is obvious which of these two methods of exercising the muscle is best calculated to restore its strength. The first law in treatment therefore should be "little and often."

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Every muscular contraction that takes place, unless it is purely reflex, entails the use of a large number of nerve elements as well as that of the centre of volition. From the ideational centre an impulse passes to the motor cortex, thence to the medulla, the cord, the anterior horn cells, the nerves, and finally to the neuro-muscular element, which then records the visible result of the impulse in the form of contraction of the muscle. In addition, the linking up with the cerebellum controls the movement and co-ordinates it. To secure voluntary movement each link in this chain must be in working order, and it is the masseur's duty to discover if any bar to freedom of movement is due to the weakness of any link.

The highest centre of all, the moral centre, may be at fault and we find the malingerer; the potential of the ideational centre may be lowered as the result of fatigue and we have to deal with a neurasthenic. If this centre is diseased, hysteria or psychasthenia is the cause of the inability to perform voluntary activities. Somewhere lower down there may be a break in the continuity of the chain, and the patient may literally have forgotten how to get the impulse through from brain to muscle. This condition is frequently encountered after prolonged immobilisation, when so-called "sling atrophy" has become an established fact.

The author is now engaged in re-educating the movements in the arm of a boy who, some two and a half years ago, sustained a simple fracture of his clavicle. For two years the hand and arm were allowed to hang useless, with the result that the whole limb appeared to consist of nothing but skin and bone. Only the faintest possible response could be obtained to strong galvanic currents, and some muscles failed to respond to the strongest stimulation given. Every muscle now responds to faradism and the limb is normal in appearance. It is still practically useless. There was never any true nerve lesion so far as can be ascertained, and many months must still elapse before the boy will learn to pass his impulses

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through the block, which exists, probably, in the anterior horn connections.

The first step in the re-education of such a case as this, or indeed in all cases where muscular disuse is a marked factor in causing disability, is to centre the attention of the patient on one muscle or muscle group. He is told, for instance, to look at his hand, which is held supported before him. The command is next given to raise the hand to the mouth, and instantly the movement is performed quite slowly by the worker. At first, perhaps, no perceptible contraction will take place in the biceps, but it is an elastic structure, and the fact of raising the hand must cause the muscle to shorten. The patient is next told to allow the hand to drop on his lap, and it is slowly allowed to do so. The process is repeated three or four times, with a minute's pause for general massage of the arm. Then the patient's attention is called to the biceps, and while the masseur's one hand controls the movement, the first finger of the other hand taps on the centre of the biceps and the order is given to "tighten this muscle" as the hand rises. Presently a twitch will be noticed, and the patient's attention is called to it and he is instructed to do it again. From this point onwards all is plain sailing, but the process of self-suggestion is one which needs to be applied throughout all the earlier stages of treatment. A patient may often appear to be incapable of performing a certain movement, but show him the tendon of the muscle that controls the movement and tell him to make it stand out, or tap on the belly of the muscle and tell him to contract at that point, and quite often the movement will be performed without difficulty. It is often of great assistance to carry out the identical process in the sound limb.

The great danger in the early stages is to overdo things and try to rush the recovery. Fatigue has the same effect on a weakened muscle that we expect to find when "flogging the tired horse"—both alike suffer severe injury. In prescribing exercises for patients with heart disease, we aim at strengthening the muscles of the heart, and

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never dream of ordering any movement that might give rise to fatigue. If we do, we know the danger, namely, heart failure : let us beware, then, of fatiguing a weakened skeletal muscle, for assuredly the result will be muscle failure. One of the early symptoms is tremor.

Having made two or three tentative trials to secure contraction, whether success has attended our efforts or no, a few minutes should be spent in massage, and then the process may be repeated. This is called by Lovett the "spacing of exercise," and he has called attention to its supreme importance in the *American Journal of the Medical Association*, March, 1916.

As soon as voluntary contraction can be secured in response to the word of command, the patient is instructed to contract the muscle twice or three times every hour after treatment. He may only succeed for two or three hours at first and then fail ; but with a little perseverance he will be able to perform his exercise right through to the time of the next treatment. Then he is instructed to contract the muscle four, five, or six times at each attempt, and as soon as this can be accomplished he is taught to hold the contraction while he counts three, then while he counts four, five, and six during each contraction.

By this time the contraction will be productive of movement, and the limb can now be held in various positions during the counting, and then the way is open for the prescription of a more advanced form of exercise. It is at this stage that some form of apparatus is of great assistance.

The first principle in the use of the weight and pulley is to devise an exercise that will allow the muscle we hope to strengthen simply to contract and relax without effort—in other words, an assistive movement exercise. For example, in exercising the quadriceps the patient should stand facing the apparatus with the cord attached to the foot (*cf.* Figs. 46 and 47, p. 94). He then flexes the thigh with the knee straight and extends the thigh while the knee is flexed. The same effect can be secured by using the vertical cord and a knee-stool (see Fig. 44, p. 92).

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Reduction of weight adds to the amount of exercise given, as the pull of the cord tends to support the weight of the leg. Provided the exercise is devised so that the weights tend merely to relieve the muscles of the effect of gravity, the exercise may be prescribed freely almost from the

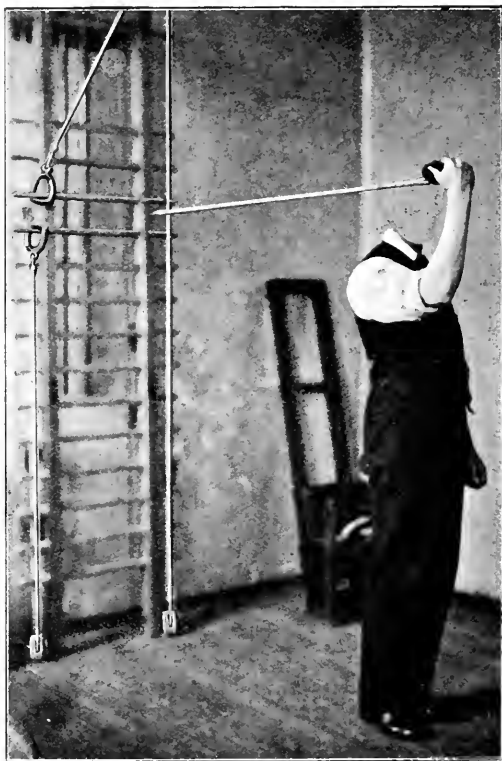


FIG. 80.—To illustrate an exercise for the biceps with the weight and pulley. No exertion is imposed upon the muscle.

start ; but care must be taken lest, by paying too little consideration to this force, we give the antagonists too severe a dose of exercise.

A corresponding exercise for the biceps humeri may be performed with the back to the apparatus while the horizontal cord passes over the shoulder (see Fig. 80).

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The weights are gradually reduced to a minimum. Next the patient faces about and then tries to pull the same cord towards him. This should only be done once or twice on the first day, on the next two or three times, while each following day either a weight is added or the

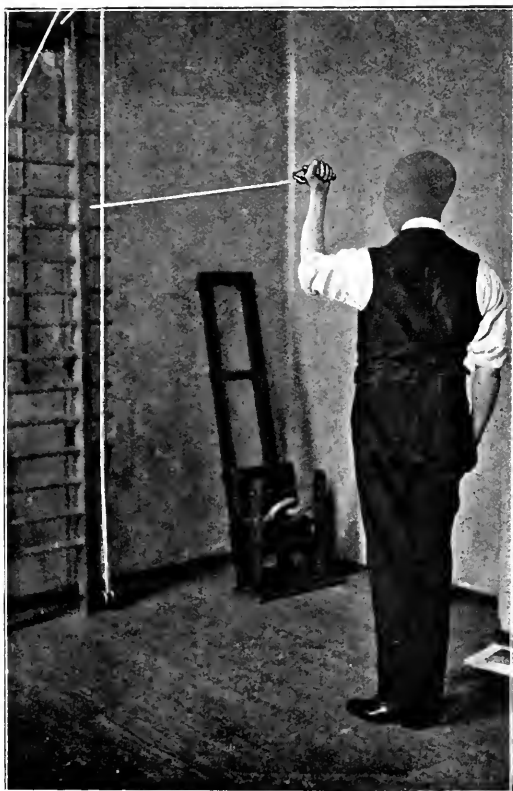


FIG. 81.—To show the converse of Fig. 80. The biceps is now called upon to work.

patient performs the exercise with increased frequency (see Fig. 81).

So, too, in exercising the quadriceps the patient has only to reverse his position to secure resistive exercise, which is increased daily either by using additional weight, by increased frequency of the movement, or by holding

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the weights fully supported while he counts during an increasing length of time (see Fig. 45, p. 93).



FIG. 82.—First position when utilising a door to re-educate arm movements. The patient crawls up with his fingers as high as he can. Note that the door is fixed by the patient's foot.

Presently the patient may be promoted to exercises on the ladder, and in performing these the same gradual increase in severity or in frequency may be made, until the most strenuous of exercises can be performed with freedom. It should be added that, during the early stages, the sound limb does most of the work, next the two limbs share it equally, and then an ever-increasing proportion is thrown on to the unsound limb—now nearly sound once more—until it alone bears the full body-weight throughout the exercise.

The skilful blending and graduation of exercises is a task which would appear to be perfectly simple ; in practice it is the rarest possible event to find a worker who will perform it conscientiously. This is not due to lack of interest, and can rarely be due to lack of intelligence, so the only alternative left is to presume that it is due to lack of comprehension of the importance of re-education and of the wonderful effect of the *gradual* increase of exercise.

Yet herein is the whole secret of success in the treatment of injury, be it recent or of long standing.

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A few words must suffice to indicate other useful points in re-educating a patient in the use of his arm.

For movements of the shoulder "crawling up the wall"



FIG. 83.—Second position when utilising a door to re-educate arm movements. The body is moved nearer the door, the hand drops slightly, and the elbow bends. The head is dropped forward.



FIG. 84.—Third position when utilising a door to re-educate arm movements. The body rotates slightly, and the elbow remains stationary, while the hand falls naturally to the back of the head, which is then extended.

does not suffice. A line must be drawn on the wall, and, having reached the mark, the patient must practise raising the hand from the wall. Thus he should have three marks, one showing the level at which he can raise his hand from

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the support of the wall while he counts three slowly, the next marks the highest position at which he can raise it momentarily, while the third is placed at the spot beyond which he is unable to reach. All should progress upwards



FIG. 85. — An early exercise with the weight and pulley if the left hand is unable to grasp the handle.

daily, and, when the last has reached the anatomical limit, the others gradually approach it till they coincide. A useful exercise has been devised by Robert Jones. He utilises an ordinary door instead of more elaborate apparatus. The three main positions in the exercise are illustrated in Figs. 82, 83, and 84.

For shoulder and elbow alike various points on the clothing may take the place of the marks on the wall, and exercises with a stick or pole are very valuable. The pole is grasped during the early stages with the hands well apart; as recovery progresses they are approximated.

Exercises for rotation of forearm, of shoulder, or of both together, can be graduated by the use of an umbrella, a heavy stick, and pokers of various weights. The elbow may be held fixed against the side of the body or fully extended (see Figs. 60 and 61, pp. 122—123). All "half-way" positions should be prohibited.

The weapon is grasped in its centre during the early stages, and, as strength increases, the grasp shifts towards one end while the other projects further and further upwards. The exercise can be made more strenuous by slow performance, the duration of each movement from vertical to horizontal being regulated

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by counting. Where apparatus is available the first stage is to work at roller or rotator when no weight is attached, ever-increasing resistance being graduated by the use of additional weights. When the weight is fully wound up by the roller an excellent exercise is to release the ratchet and to control the fall of the weight by friction exerted by the grasp.

To restore suppleness to the fingers nothing can replace natural use. The simplest way to accomplish this is to pad one of the handles of the weight and pulley with a duster till of sufficient size for the patient to grasp. If necessary the sound hand may assist by being placed over the injured member (see Fig. 85). The weight is then increased daily. As soon as this has assumed fair proportions, the weight is decreased during part of the time, the padding is diminished, and the injured hand works unassisted. As soon as the fingers can make any attempt at grasping the bare handle, ladder exercises are commenced. It is wonderful at times to see a man, who has been unable to grasp anything for months, gradually tighten his grip on the rung of a ladder as his sound arm tires. Nature seems to prompt his maimed hand to work in order to relieve its fellow. No set exercise can be devised that will replace natural use, and no combination of exercises can equal in curative effect the use of a scythe or grass shears for one whose grip is enfeebled. Grasping various-sized objects and trying to hide them from view in the palm is an excellent exercise, and reference must be made again to Tait Mackenzie's plan of taking up half a sheet of newspaper by its corner and gradually rolling it up into a ball in the palm of the hand.

CHAPTER XVIII.

RE-EDUCATION IN WALKING.

RE-EDUCATION in walking is a special art which calls for the exercise of great skill, but the reward is directly proportionate to the amount displayed.

Muscle re-education should commence before any joint can be moved and while, if necessary, the limb is still encased in plaster. The patient is taught to contract and exercise each muscle or muscle group in turn in the manner already described for the treatment of splint or sling atrophy of the arm.

Too much importance cannot be attached to ensuring the return of co-ordination. After any lengthy period of inaction, from whatever cause, this power is impaired, and after injury the impairment is more marked. Every movement is the result of muscular contraction combined with relaxation of the antagonistic muscles. In walking, not only is this true, but the efficient working of one muscle is dependent on similar capacity in many others, some of them very remote. Even the placing of both hands in the trouser pockets has a marked effect on the general co-ordination of the body during locomotion. It is easy, therefore, to realise that marked weakness of one muscle, or of a group of muscles more intimately concerned with the movements of the lower limbs, will greatly militate against perfect co-ordination. Yet after injury of any sort there is a tendency for muscular wasting to follow, perhaps from disuse only, perhaps as a result of injury inflicted directly on the muscle, its nerve or vascular supply, or even on account of reflex action excited by injury to a joint whose movement is controlled by the muscle. Not only is the wasting significant of weakness, but a wasted muscle invariably requires a longer latent

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period to pass than does a normal muscle between the receipt of stimulus *via* its nerve and its subsequent response. This often holds good even if no wasting can be detected. Thus it is impossible for a muscle which has been injured to react normally to the impulses it receives, but the uninjured muscles concerned continue to do so. The inevitable result is loss of co-ordination.

Our first business, then, is to ensure the restoration of co-ordination in existing circumstances—or, in other words, to teach the muscles that have suffered least, or not at all, to adapt their contraction to suit that of their

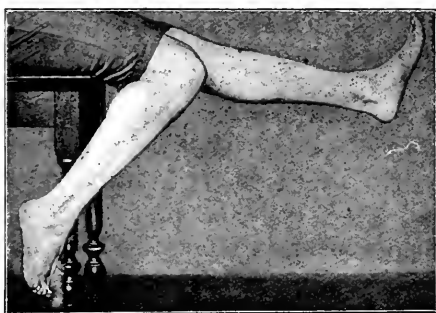


FIG. 86.—The final swinging exercise while sitting. Note the plantar flexion of the ankle with flexion of the knee, and dorsi-flexion with extension of the knee.

less fortunate fellows—and then to continue the process by educating the sound limb to adapt itself to any little vagaries of the injured limb.

The most simple movements should precede the more complicated, and so the first stage, whenever possible, should be to encourage the patient to swing the feet to and fro alternately over the side of the bed or couch. Often the first instinct of the patient is to swing them together, but this must be prohibited until the alternate swing has become quite natural, free from all rigidity and stiffness, until, in fact, a "loose swing" has been attained. Then swinging together may be prescribed, followed by the performance of the two exercises alternately. These

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exercises must be continued till their performance is quite natural and free from all effort.

The second stage is to educate the toes and ankles to co-operate in the movement, and the swinging exercise may be advanced a stage by being performed with regular alterations in the rhythm. The best plan is for the patient to swing the feet alternately three or four times and then

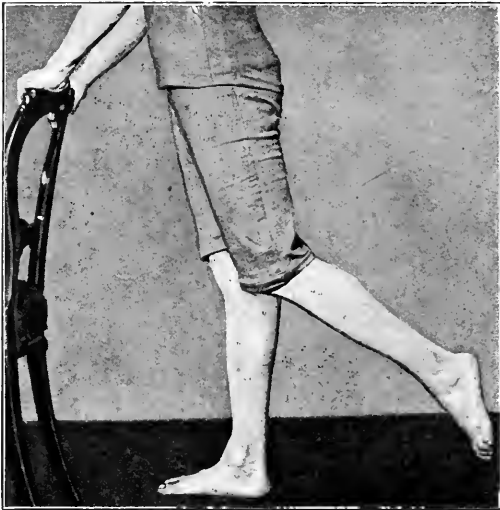


FIG. 87.—Swinging the leg while standing. Note plantar flexion of the ankle and flexion of the knee. The patient is shown supporting himself by a chair placed in front of him for clearness in reproduction.

to hold the sound leg out straight while counting three slowly. The swinging is continued and the weakened leg is held in the same position for the same time. The length of time is gradually increased. The process is repeated, but now the cessation of movement takes place in the flexed position. Finally the movement is checked and contraction held with one knee bent and the other straight (see Fig. 86). By the addition of light hip movements the patient is now able to perform full "bicycling" movements in the air.

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Two exercises can now be added. The patient stands on the sound leg between two chairs placed back to back and swings the injured leg to and fro. At first this will be done with a stiff knee and ankle, but gradually the muscles will be able to relax and the knee will bend as the thigh extends and the ankle will plantar-flex (see Fig. 87). On swinging forward, the knee will straighten and the ankle dorsi-flex (see Fig. 88). This is the natural movement of walking, and it may require close attention to see that it is efficiently carried out. It will be noticed that in this exercise alone a different combination of movement is required when treating a patient by relaxed or by active exercises (*cf.* p. 71). This is because the ankle movement in walking is the only natural movement that is performed in such a manner that the musculature is, as it were, at a disadvantage. Hence the natural "trick" of ankle movement in walking is very readily lost and supplanted by purely "natural" movement.

After a few swings the patient sits down and places both feet flat on the floor with the knees extended to slightly more than a right angle. The toes of the sound foot are then raised from the floor and are lowered again while the heel rests on the ground (*cf.* Fig. 91). The foot of the injured limb follows suit. Flexion of the knee progresses until a point is reached when it is impossible to raise the toes, and then the heels are raised alternately while the



FIG. 88. — Second stage in swinging the knee. Note dorsi-flexion with extension of the knee.

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toes rest on the floor (see Fig. 89). As the feet get further and further under the chair the movement becomes more



FIG. 89.—Second stage of the first sitting exercise. The heel is raised and lowered.

limited till finally little or no movement can be obtained, but the toes and ankle can still be exercised together (see

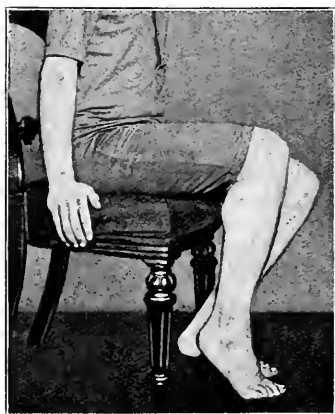


FIG. 90.—The final stage in the first sitting exercise. The heels cannot reach the ground.

Fig. 90). Once more the knees extend slightly till the soles of the feet rest easily on the ground. The two

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exercises are then combined, and the patient executes a species of "clog-dance" (see Fig. 91). The sense of hearing helps to maintain the rhythm. It will then be found that all the movements of ankle and toes that form a part of natural walking have been performed. The exercises can be made more severe from day to day by increasing the frequency of the movements, by the gradual alteration of the position of the feet, and by holding them in the extremes of movement while counting. Between



FIG. 91.—The first two sitting exercises in the re-education of walking combined. The toes are raised and lowered, alternating with similar action of the heels. The result is the "species of clog-dance" referred to in the text.

the exercises, unless contra-indicated (as, for instance, after a recent fracture of the internal malleolus), the patient is taught to rest with the legs crossed and the feet resting on their outer borders. He is then told to claw with the toes and to try to shape the foot as would do a monkey trying to climb up a pole. Having learnt to "claw" properly, he is told to maintain the position while counting (see Fig. 92).

Thus far only a negligible amount of weight has been placed upon the feet during the exercises, and the main object hitherto has been to accustom the limbs to move

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in unison, and to train the various muscle groups in the injured limb to co-operate with one another. Meanwhile it is possible to continue to build up the strength of the weakened muscle groups by perseverance with the original exercise of holding contraction, while counting, without actual joint movement, and by paying especial attention to holding the contraction during certain movements of those muscles which are weakened.

Exercises on the sliding-seat follow. They should commence with the foot-piece loose and the bar through the



FIG. 92.—To illustrate the "clawing" exercise while sitting.

lowest hole. Day by day the bar is raised, and the elevation of the inclined plane is thus increased. When the exercise can be performed freely with the elevation at its maximum, considerable pressure is exerted on the foot. Probably the patient will do most of the work with the sound leg: this does not matter, as it will tire and the injured limb will then be called upon instinctively to play its part. Moreover, all the time hip, knee, and ankle are acting in unison. The masseur can often assist greatly by supporting the knee, or even by

gentle kneading during the limits of movement if flexion is deficient. Extension can be aided by pressure on the knee while kneading the hamstrings. The great point is to see that the seat is driven back to the limit.

The bar is then lowered and the foot-piece is fixed in the position most adapted to secure the performance of the particular movement which happens to be most limited. The more nearly the foot-piece approaches the horizontal the more full does flexion of the knee become. The bar is raised gradually as the days pass.

Assistance to all these movements can be given by various combinations with the weight and pulley. The

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lowest pulley can be utilised by holding the cords in the hands ; thus rowing is more nearly simulated. The rope over the top pulley can be attached round the knee, but this device is not used very frequently. The patient can

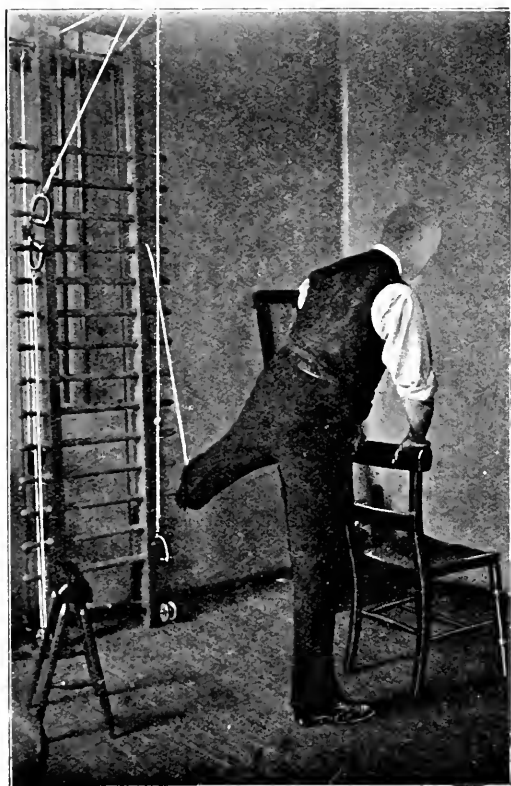


FIG. 93.—To illustrate an exercise for the adductors of the thigh. It is also either a relaxed or assistive exercise for the abductors according to the weight employed.

be taught to assist the movement by keeping the hands on the knees and pressing down, or under the knees and pulling up (*c/.* Figs. 42 and 43, p. 91). Otherwise the hands should be held in the “wing” position.

By this time more particular attention can be given to

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the strengthening of special groups of muscles by use of the weight and pulley. The most important exercise, and perhaps the most frequently overlooked, is that for the quadriceps, which is performed with the patient sitting, the cord passing under the chair and then under a stool

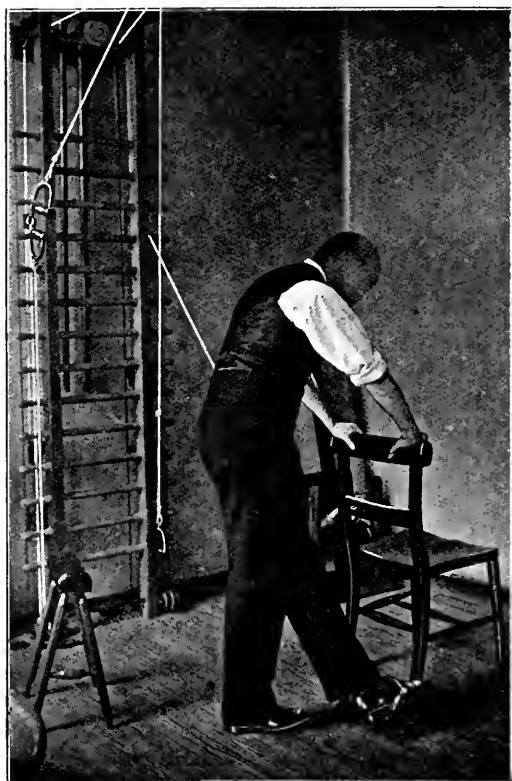


FIG. 94.—To illustrate the remainder of the exercise shown in Fig. 93.

placed in front of it on which rests the knee (see Figs. 44 and 45, p. 93). The knee is alternately extended and flexed. All the other thigh muscles can be exercised most efficiently while standing on the sound leg. The hands should then, as a rule, rest on the backs of two chairs, between which the patient stands while facing or

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with his back to the apparatus (see Figs. 46 to 49, p. 94), or with the hands resting on the back of a chair if standing "side-on" to the wall (see Figs. 93 and 94). As with all weight and pulley exercises, the severity must be gradually but steadily increased, either by adding to the number of movements or to the weight, or by holding the muscles in contraction while counting, or by increasing the range of movement. Assistive movement must precede resistive.

The patient is now ready to commence to bear his body-weight, but he should be taught to do this gradually, otherwise he will lack confidence in the weakened limb.

The first stage in bearing weight upon the limb is the natural continuation of the "clawing" exercise which the patient has been performing seated on a chair. He places his hand on the seat, and then, with feet crossed and the outer borders in contact with the floor, he rises from the seat a few inches, supporting most of his weight on his hands (see Fig. 95). Day by day he rises higher and higher, and presently his hands leave the chair, with



FIG. 95.—The third sitting exercise in the re-education of walking, continuation of the "clawing" exercise. Note the body weight is still partly supported by the arms.

the result that the whole body-weight rests momentarily upon his feet. As he rises higher and higher the length of time steadily increases, till finally he stands upright.

The chair is now placed in front of him and he supports much of his weight on its back. Taking the remainder of the weight on the outer side of the sound foot, he uncrosses the other leg and stands on his feet, which now rest side by side on the floor, the weight still being borne

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FIG. 96.—To illustrate simple knee-bending. Note that the body-weight falls on the outer sides of the feet.

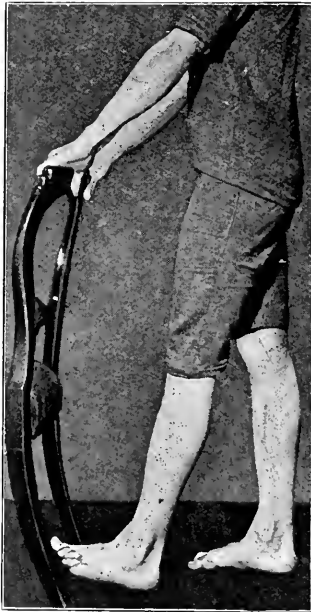


FIG. 97.—To show how the patient takes the first quarter of a full step. The left leg has been swung to and fro and is then checked in the position shown.

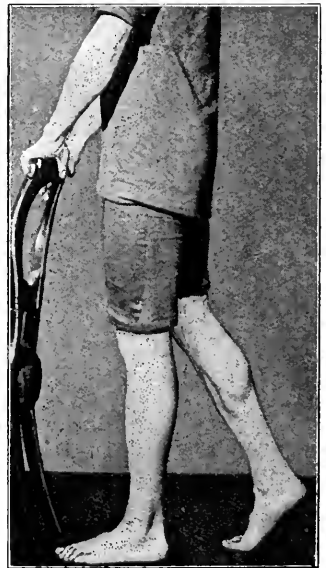


FIG. 98.—The second stage in taking a step. The patient then returns to the position shown in Fig. 96, and learns to "rock" to and fro.

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on the outer border. The first "free standing" exercise is now performed by simple knee-bending through a few degrees only (see Fig. 96).

Soon the patient stands on his sound limb, swings the other to and fro, and then, when the foot is falling from the front position, the heel is made to check the return by contact with the ground (see Fig. 97). With perseverance comes perfect co-ordination in the performance

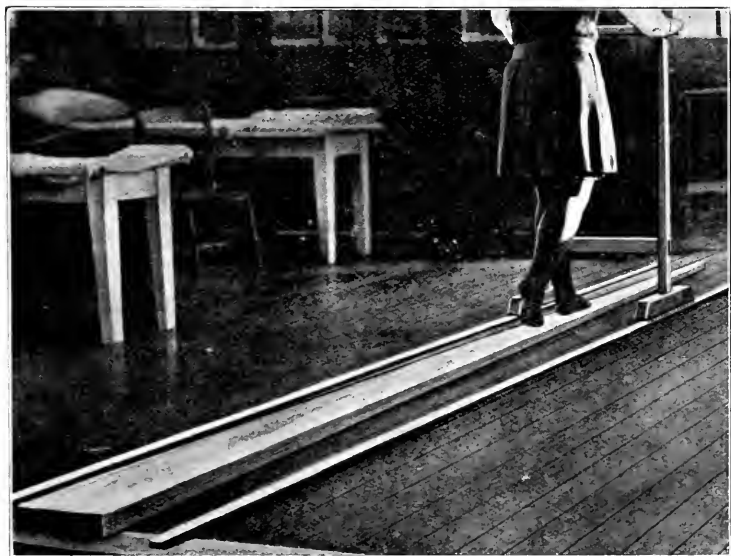


FIG. 99.—Practising "rocking" on the walking-board. The latter is a mere adaptation of a boom, and the trolley replaces a balancing pole.

of this movement, and the power correctly to perform the first part of the natural walking step is restored.

The next stage is to perform this exercise once more, but now, as soon as the heel of the injured limb touches the floor, the body-weight is thrown forwards, the toes of the injured limb fall to the floor, and the heel of the sound limb is raised (see Fig. 98). Return to the *status quo ante* completes the exercise.

As soon as the patient can "rock" to and fro in this

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manner he can perform about three-quarters of a single complete step, but so far the injured foot has been in front. Now he must practise the "rocking" with the sound foot in front and that of the injured limb behind. The next advance is to withdraw the moral support of the chair-back, first by taking one hand off, then the other, and finally by moving the chair to a point where

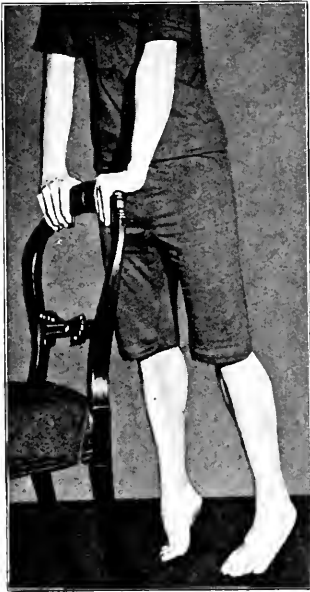


FIG. 100.—To show the first position for ordinary tip-toe exercises.

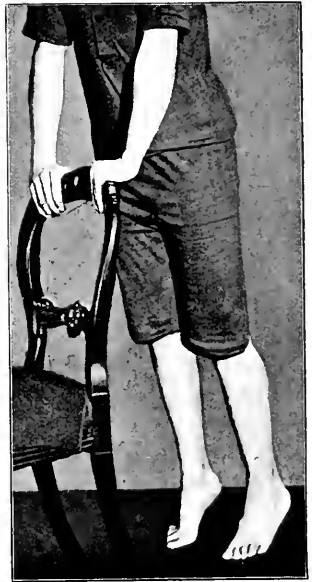


FIG. 101.--The second position in tip-toe exercises. The weight of the body has been rolled across the transverse metatarsal arch.

the patient is not able to touch it, but where he could do so without any difficulty whatever if emergency arose.

A step and a half is now undertaken up to the chair and then the return is made. This constitutes a more advanced form of "rocking."

Great care should be taken to ensure that in all walking exercises the feet are kept straight and that thereby the weight is thrown on the outer borders of the feet. It is

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also essential at this stage that the patient should be instructed to confine his efforts to the true "heel-and-toe" walking only. A line may be drawn on the floor on which the patient must place his feet, or, better still, two lines are drawn, and in the space between them the patient walks. At the Military Orthopædic Hospital at Shepherd's Bush the author has arranged a modification of balancing on a boom. A strip of thick wood is placed on the floor (broad at one end to give the patient confidence, narrow at the other) on which the patient performs the exercises. The place of the chair is taken by a trolley support (see Fig. 99).

All the ordinary leg and foot exercises may now be undertaken, but a word is necessary as to their performance.

The patient stands with the weight of the body on the outer borders of his feet; the inner borders need not be completely raised, but should bear no weight. The heels and toes are kept parallel and the feet about four inches apart. The knees are kept very slightly flexed. The body-weight is then thrown on to the heels and is gradually transferred forwards till most of the weight is on the head of the fifth metatarsal (see Fig. 100). The knees now perform a kind of circling movement which throws the weight more and more towards the inner side of the transverse metatarsal arch, the heels meanwhile being raised slightly (see Fig. 101). The toes are then turned inwards and the heels out, and

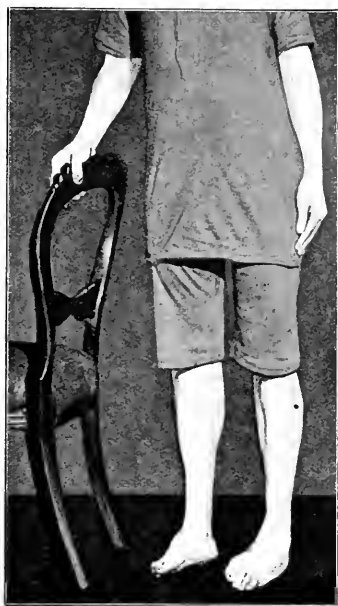


FIG. 102.—To show the raising of the inner side of the feet while the toes perform the "clawing" exercise.

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the exercise is repeated. The third stage is to reverse the position (heels together, toes out) and repeat. If there is any tendency to flat-foot, this exercise should be omitted until muscular strength is sufficiently restored to ensure that there shall be no strain on the plantar ligaments. The same applies to the exercise illustrated in Fig. 104.

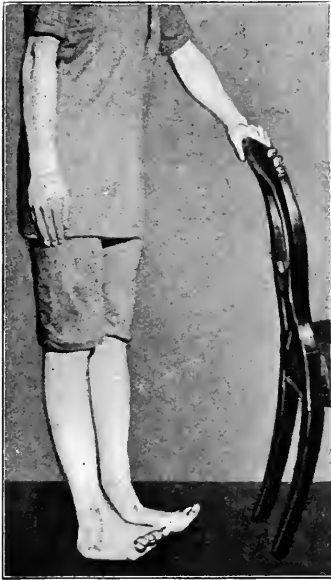


FIG. 103.—To illustrate the exercise in which the patient stands on the heels. Note that the inner borders of the feet are raised.

Raising and lowering the inner sides of the feet, which are placed parallel to one another again (see Fig. 102), “clawing” meanwhile, forms the fourth part of the exercise, while the fifth consists of standing on the heels and raising the toes (see Fig. 103). The sixth and last is the ordinary heel-raising-knee-bending exercise, but this should be performed in at least two positions, one with the feet parallel and the knees touching (see Fig. 104), the other with the toes apart and heels together (see Fig. 105). No matter how far the toes may be everted, care should be taken to ensure that the limb bends so as to maintain the long axis of the thigh parallel with that of the foot. Another point to remember is that patients are usually allowed to perform this movement far too rapidly. The heels should be raised to their full extent and the knees driven firmly backwards before any bending is commenced. The bending should be performed very slowly and very gradually, and the patient should “squat” on the heels while he counts

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“ three ” very slowly before returning to the original position on tip-toe with the knees taut.

These six (or seven) several exercises should be regarded as various parts of a single exercise. In the massage-room they should be performed once, a few minutes' massage follows, and then they are performed again. As soon as the patient can be relied upon to perform the exercise efficiently, he is instructed to do so twice or three times a day. Thus on getting out of bed in the morning he does it once, a second time after shaving, a third after his bath,

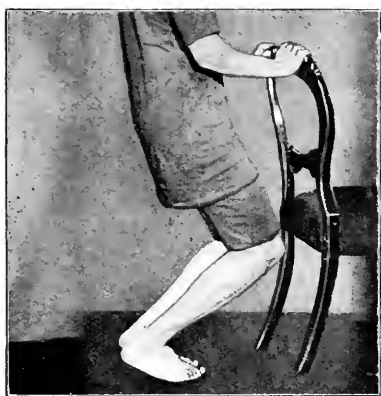


FIG. 104.--The first heel-raising-knee-bending exercise. Note the knees fall directly over the toes. The feet are kept parallel.

and so on up to eight or ten times. The “ spacing ” of the exercise is most important.

Skiping is invaluable as a *finale* in treatment, while tip-toe walking, “ goose-step,” and heel walking all have their place.

Bicycling can frequently be started at an early date, and “ kneeling-trunk-falling ” is often of great service (see Fig. 106). As pointed out in a previous chapter (see p. 156), it is essential to regard and strengthen the lower fibres of the vastus internus in nearly all cases of leg injury.

Before the patient is discharged, an attempt must be

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made to impress the necessity of walking with heels and toes parallel, of standing with the toes slightly turned in while the knees remain stiff, and of avoiding the "toes-out-knee-bent" position, which is so easily acquired and so hard to discontinue. It is often wise to build up the sole and heel of the boot or shoe on the inner side by about half an inch. This ensures the main-

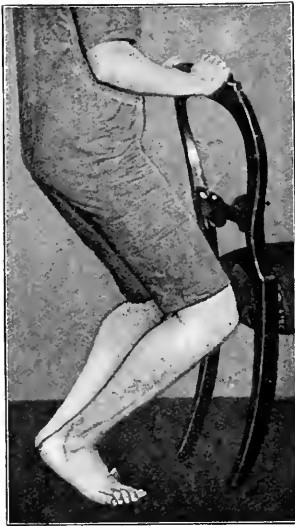


FIG. 105.—The second heel-raising-knee-bending exercise. Note the knees still fall directly over the toes. The feet are at about an angle of 90° to one another.

tenance of the correct position of the feet, but the patient must be impressed with the vital importance of conscientiously performing the true "heel-and-toe" movement, and of stiffening the knee from the moment the heel touches the floor until it leaves it again.

Thus is performed the re-education in walking. Once allow a patient to limp for any length of time, and he may acquire a life-long habit, which may, in turn, lead to grave disability out of all proportion to the original injury.

Modifications are required to suit each individual case, but the general principles should always be observed.

And in this as in all remedial exercise the most important point to observe, if success is to be ensured, is so to arrange the exercises that progress may be made day by day, and that each addition is so slight that the patient's muscles are unable to recognise any increase in the strain put upon them.

It will be noticed, in the description of the re-education, that every care is taken to ensure against any dropping of the longitudinal arch of the foot ; but, if this

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has taken place and the patient is flat-footed, all the joints in the foot must be loosened thoroughly by movement, and then the re-education exercises will provide a perfect scheme for the restoration of the disability. If actual deformity is present, exercises can sometimes relieve the patient to a certain extent ; but to secure perfect restora-



FIG. 106.—The end position of kneeling-trunk-falling and raising.

tion it is often necessary to place the limb in plaster after a thorough wrenching of all the joints of the foot. As a preliminary, if the case is acute and the foot swollen, blue, and cold, general massage to benefit the circulation should be given for a few days while the patient is kept in bed. All the muscles should be exercised regularly meantime, but without placing the foot on the floor. When the plaster has been removed the patient must be warned forthwith that under no circumstances is he to

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stand on the floor without wearing boots or shoes raised on the inner side, as already described, or to allow his weight to fall on the inner side of his foot during the exercises. It is well to remind the patient that even when taking a bath he must stand in such a position that the longitudinal arch is maintained. His trouble has been due to the stretching of the structures in the sole. The moulding of the foot has relaxed them, but has not

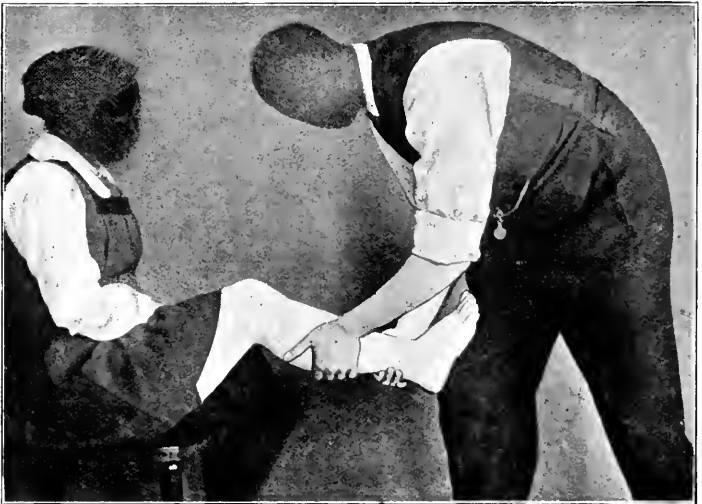


FIG. 107.—To show one method of attempting to stretch the tendo Achillis.

shortened them again ; it has only made shortening possible. This takes time, and, if they are stretched again once only, the good acquired by weeks of patient work can be undone in five minutes.

The "clawing" with feet crossed is also designed to arrest the dropping of the anterior metatarsal arch and subsequent metatarsalgia. Should this develop it is important to secure relief at once by strapping the arch, pending the restoration of the foot by the exercises. Assistance can also be afforded by inserting pads behind the heads of the metatarsals or by placing a bar of

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leather—as on a football boot—under the sole. It should cross the sole obliquely a little behind the level of the heads of the metatarsals.

This device is often of service in the treatment of claw-foot. The disability here arises from insufficiency of the tendo Achillis. The bar, by dorsi-flexing the foot in walking, naturally entails the stretching of the tendon, and every exercise should be devised to assist the process. Massage for this condition sometimes helps to an appreciable extent. The patient should sit facing the masseur, who stands with one foot forward and knee bent. The patient places his foot flat on the inclined plane formed by the masseur's thigh (see Fig. 107). The inclination is gradually reduced while deep lateral manipulation of the calf is performed. The tendon itself may be vibrated. All the extensors of the toes require stretching, and here again the vibrator is very useful. It is essential that all the joints in the foot should be loosened as thoroughly as possible, especially the tarso-metatarsal joints.

CHAPTER XIX.

MASSAGE TREATMENT IN NEURASTHENIA.

It has been said that only those who have been victims of neurasthenia are competent to treat it. However valuable may be the experience, it cannot be regarded as essential, though only those who are capable of appreciating the sufferings of their patients should undertake their treatment. To some minds the illness seems to be quite incomprehensible, and so it comes about that some masseurs are temperamentally unfit to deal with this class of case. For their own credit, no less than for the sake of their patients, they would be well advised to recognise their incapacity and refuse to undertake the work.

For treatment to be effective there must be a clear understanding of the condition that exists, how it has developed, and what progress should be expected.

There is a tendency, not only among the laity, but even among medical men, to despise the neurasthenic. The idea seems to be deep-rooted that, because a patient fails to produce physical signs to account for the symptoms, therefore the whole illness is imaginary. Those who hold this view would be not a little incredulous if they were told that they had suffered from neurasthenic symptoms themselves, yet so it is. We are all neurasthenics at times, though for most of us the attack is transient, thanks to the provision of recuperative power by a merciful Providence. The most unlikely subject for an attack may go for a long day's tramp, shoot, or golf. He comes home, has a hot bath and a good dinner, and then sits down in front of the fire to read. He feels in his pocket for a pipe and finds it is upstairs. A wave of irritation passes over him totally out of proportion to the cause,

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and he experiences for a brief moment one of the symptoms of neurasthenia. This victim goes to bed, has a good night's sleep, and the attack is over ; but let him pass a restless night and his irritability next day will be very marked. Repetition of a few more strenuous days without adequate rest, and appetite will fail, trifles will begin to worry, and many of the symptoms of a neurasthenic attack will be well established.

Most of us know the " good-for-nothing " feeling that follows an attack of influenza, tonsilitis, or other infective illness, and have experienced the irritability that accompanies it. Any trifle is liable to annoy, everything fatigues. If recuperative power is good, these symptoms soon vanish. But imagine the poison to have bitten a little deeper, magnify this irritability and fatigue, and we can appreciate that the neurasthenic symptoms might be very serious. If people would only realise the necessity of allowing adequate time to pass to ensure complete recovery after an attack of influenza before resuming work, there would be less neurasthenia.

The psychical state produced by anxiety or trouble can supply symptoms which exactly correspond to those that follow sepsis, and are more or less familiar to most of us. Magnify the experience common to us all, and we see the picture of neurasthenia.

Neurasthenia is not an illness of imagination, and, if we want to discover the cause of the illness, we must take into consideration the whole of the patient's circumstances, his whole life, which Herbert Spencer described as consisting of " the definite combination of heterogeneous circumstances, both simultaneous and successive, in direct combination with external co-existences and sequences." If we take the trouble to do this, a careful study has shown that, far from despising the neurasthenic, we are often compelled to admire the pluck and determination that has postponed the final crash for, it may be, years. In the first place, then, if we wish to treat neurasthenics at all, let us extend to them sympathy begotten of a full understanding of the cause of their attack ; and

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our respect when, as is so often the case, they have merited it by the fight they have put up against their symptoms. There must of course be no maudlin sentimentality in our attitude to our patients ; this must be moulded only by appreciation of their past and present state.

Most writers on neurasthenia are agreed that the diagnosis cannot be justified unless there is fatigue. This may be due to physical or psychical exhaustion, or to any cause that saps vitality, the chief being sepsis. Fatigue of the nervous system simply amounts to this, that the nervous energy remaining is inadequate for all the needs of the mind and body. The highest centres, being the last to develop, and therefore being the most intricate, suffer first ; and so the mentality of the patient "gives out" and the perspective of life is lost. To quote from Lewis Carroll, the neurasthenic tends "to look at all things with a sort of mental squint."

As the illness advances, the "lowering of the amount of the nervous potential that is available for the use of the organism," as Maurice Wright expresses it, leads to "deficiency in the innervation of the bodily functions," and we find that such troubles as indigestion and constipation develop. The stomach is not diseased. The deficient innervation has led to loss of muscular tone, the stomach fails to empty itself as it should, and the patient suffers from flatulent dyspepsia, which is usually accompanied by hyperacidity. So, too, the muscles of the lower bowel lose their tone, simply from lack of adequate nerve control. Then we see the possibility of two of the vicious circles of neurasthenia. The nerve fatigue interferes with digestion, absorption is deficient, nutrition fails, and the nervous system suffers further in consequence. So, too, the nerve fatigue interferes with normal defæcation, septic absorption takes place, and the poison further lowers the vitality of the nervous system. The onset of insomnia adds another very serious item, which can take its place as a potent factor in any of the numerous vicious circles it is possible to describe.

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When the attack is established there are three main features—fatigue, depression, and irritability.

The fatigue of the neurasthenic is genuine ; there is a real muscular asthenia due to deficient innervation. It is true that the neurasthenic can, in a moment of emergency, exhibit considerable powers of endurance ; but so can a patient who is failing in the later stages of diabetes, consumption, or other chronic conditions. But whereas in the latter instances the effort may hasten the end, in the neurasthenic it only tends to increase the severity of the symptoms. Thus the common advice of “pull yourself together” is really the worst that can be offered, and many victims owe their downfall to the mistaken sense of duty that has impelled them to “pull themselves together” instead of “giving in” while the condition was not yet serious. The fact that the muscular asthenia is present tempts us to strengthen the muscles by the prescription of exercises. There could be no greater error in treatment. The muscles themselves are healthy ; it is their innervation that is at fault, and the nervous energy expended in the performance of exercises will inevitably push the patient further down the hill. When the nervous system is rested and its tone restored, muscular strength will return, and the general toning up of the muscles may be completed by exercises or, preferably, by the use of the Bergonié chair, which entails no risk of tiring a nervous system that has only recently recovered its stability.

It has been stated that the depression of the neurasthenic “is the reflection in consciousness of the plaint of the cellular aggregate, suffering from the deficiency of vegetative life.” This supposes each cell of the body to be endowed with the mental attribute of a complete and separate entity—that each cell, conscious of weariness and the depression which accompanies it unless counteracted by some all-satisfying attainment, sends up, as it were, its plaint of weariness to the brain. There, under this theory, is received an overwhelming avalanche of ceaseless complaining from millions of cells. Small

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wonder, then, that there is depression and that life is surveyed with "a sort of mental squint."

The irritability is also thereby explained. It is incredible that the mind should not suffer thus, and, unless exhaustion is too great, it is necessary that physical irritability should be its outward sign.

It is easy to understand that the combination of fatigue and depression should lead to fantastic ideas to account for the sensations experienced ; and, when we add thereto the constant liability to perverted somatic stimuli, nothing should surprise us in the way of phantasms, phobias, doubts, or misgivings. These patients are not mad ; they are merely victims of their sensations. When vaso-motor storms are added, the sufferers' condition is parlous indeed, and well may they adopt what we may call the neurasthenic's creed : " This too is vanity and vexation of spirit. Vanity of vanities : all is vanity ! "

If this is the picture of the neurasthenic, how can we compass alleviation of the symptoms ? The first obvious thing to do is to enforce rest. Bed, and bed alone, may suffice. But bed alone may only serve to aggravate the mental symptoms, whereas sometimes peace and comfort can be attained without insisting upon absolute rest in bed. It is, however, essential to insist upon the minimum expenditure of physical energy.

The faulty innervation of the stomach and the consequent inability of the organ properly to empty itself renders digestion difficult and there is loss of appetite. Hence all these patients require to be " fed up." But many have been under-fed for weeks, or it may be months, and over-feeding may do much more harm than good in the early stages of treatment. Encouragement will succeed : force will fail. So, too, the nurse who reports, " The patient made a poor breakfast but really seemed to do her best, and I am sure she will do better in a few days," will succeed ; but failure will be the reward of the report " I could not get the wretched creature to make the smallest attempt to eat anything, although I badgered away for half an hour."

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The patient invariably is endowed with the disconcerting idea that "no one ever had such an illness as this," and is therefore convinced that no one understands the condition. Hence follows distrust of doctor and nurse alike. Only too often previous experience of both has justified the opinion. So our next duty is to win the patient's confidence, and, to do this, conversation must be encouraged. As the "tale of woe" is unfolded in a "pitiful minor key" it is possible to point out how natural has been the sequence of events and how simple in reality is the explanation of the symptoms. There are three golden rules:—never to lie to a patient, never to forget what the patient has said or what has been said to the patient, and never to promise the impossible. Let us also remember that the average neurasthenic is no fool, but is usually a most highly intellectual individual for the state of life to which he or she has been called.

The illness is characterised by wave-like variations, and it is well to forewarn the patient of the fact. Peace and happiness will return in the evenings before they do so in the mornings; good days will become more and more frequent, bad days fewer and further between. The disappointment of a "bad day" after a few "good days" may throw a patient right back unless warning of the inevitable "wave" has been given. The barometer has a potent bearing upon "waves."

An acute case of short duration dating from a serious crisis, (such as an operation or accident), which is now over, will get well quickly; a chronic case of long standing, with, it may be, the main cause (such as trouble in family life) still operative, will recover very slowly.

It is usually possible to convince a patient of complete understanding of the condition, and to promise some alleviation. Then the moment any trace of improvement has been admitted we must play it for all it is worth, for, as a rule, the true neurasthenic welcomes any vestige of improvement, which the hysterical patient would equally resent.

So far we have considered what almost amounts to the

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psychical aspect of treatment. Without it purely physical treatment will rarely succeed, though the converse holds equally good, that psychical treatment without the physical is usually a failure also. In psychasthenia physical treatment is, of course, useless.

In treatment it is a fatal mistake to confuse hysteria and neurasthenia. For a hysterical patient by all means let the physical treatment approach as near punishment as may be in safety. A really heavy pummelling at the hands of an expert masseur may be beneficent, and the patients should get all they can stand, short of precipitating an outbreak. "Let us have no nonsense about it ; I have got to give you a thorough good dose and you have got to lump it " may suffice to cure an attack of hysteria, though the writer prefers psychical treatment to physical for these patients.

In the treatment of neurasthenia these tactics are fatal. The illness is due to fatigue : the massage must soothe and rest, it must not add to the fatigue. No neurasthenic should ever *require* to rest after massage owing to fatigue or exhaustion ; the desire for rest should be based on the wish for freedom to enjoy to the uttermost the luxurious sense of ease, comfort, and peace that follows the visit of the masseur. The visit and the subsequent hour or more should be the brightest spot in the patient's day. If we wish to attain this end the first law in treatment must be :—

Only the most gentle movements possible are to be performed ; any irritating (so-called stimulating) movements are to be prohibited.¹

A necessary corollary may be called the second law of treatment :—

Any point that is tender or hypersensitive is the last that should receive attention.

Many cases have been brought under the author's

¹This and the following two laws of treatment are quoted from a paper by the author read before the Medical Society of London, and published in the *Practitioner*, January, 1914. Much of this paper is here epitomised ; the paragraphs placed in quotation marks are quoted *in extenso*.

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notice in which treatment has failed owing to neglect of this law. Most neurasthenics have some area of the body on which it is impossible to perform any massage movement without producing a sensation of irritation. A single touch on this area may undo the good of half an hour's previous work. A patient who develops neurasthenic symptoms after an abdominal operation serves as an example. The symptoms will probably be attributed by the patient to pain in the scar. There may be pain of course, but its measure is central, not peripheral. Abdominal massage is ordered: it may well suffice to render the patient's condition far worse. Massage treatment should commence on the back, and, if necessary, the legs, arms, and head may be treated. Not until the patient can submit in perfect tranquillity should the abdomen be touched, and even then the site of operation must be avoided till the last. One of the signs of progress is the gradual approach to the area of chief discomfort. It is a progress the patient can note, and the "I could not have let you touch me there a week ago" is a sure sign of future success.

Details as to the exact nature of the movements that should be employed cannot be given, as of necessity they vary with each case.

The third great law of treatment is:—

The actual nature of the massage movement performed is of minor importance provided it is rhythmic.¹

" 'I shall never forget the marvel of the rhythm,' was the farewell remark of one of my patients, and I would submit that herein lies the whole secret of success in the treatment of neurasthenic patients by massage.

"An American physician . . . wrote to me recently to say, that if a patient complained of any obscure pain, his one test as to whether or no it was due to organic trouble rested on the result of massage such as I advocate. 'If,' says he, 'the pain persists in spite of massage, some

¹ Stroking is the only movement in which perfection of rhythm can be attained.

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organic lesion must be present.' I do not venture as far as this, but there is much truth in the statement. If we remember a fact, the truth of which I have proved in many hundreds of cases, viz., that the pain even of fracture can be relieved by massage, then the claim to give relief if no organic lesion is present seems less ambitious.

"The massage I advocate consists solely of a rhythmical stroking of the surface of the skin, and the lighter the stroke the more effective the massage. 'Light as a caress' . . . is the description given by the great author of this method of treatment. He invented the treatment for cases of fracture only, and has left it to his disciples to develop his method for the treatment of other complaints. I am proud to recall that he referred to me as his 'English disciple,' and deputed to me the task of preaching his gospel of healing in this country. He knew my views intimately, and I had hoped to submit this paper to him for approval, and to claim his endorsement of the statement that the rhythmical nature of the movements is not less important than their gentleness. The death of Lucas-Championnière has dissipated that hope, so I can only give you the assurance that, under happier circumstances, his approval would not have been withheld.

"So far I have spoken with the confidence bred of experience. When the question is raised as to the manner in which the massage or stroking can possibly act, we pass at once to the realm of speculation, that is, of uncertainty. One thing, nevertheless, I can assert without fear: that there is in it no element of mesmerism or any other more or less occult science. For my own part, I believe that the action of the massage is purely physical, and that the following explanation approaches to the truth. If we consider two of the impressions that reach the brain, vision and hearing, we find that the chief thing they possess in common is that they are transmitted thereto by rhythmical waves; and we know that, in the case of hearing, certain variations in the rhythm are apprehended and recognised by the brain. Such is the nature of our perception of music. It is probable that all other sensa-

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tions are due to the arrival in the brain of rhythmical impulses by way of the various sensory nerves. In the same way, we know that, in all probability, the contraction of muscles during life is due to the sending out by the nerve-cells of rhythmical impulses along the nerves. An amplification of this is found in the proverb that habit is second nature, which means that by practice and repetition human life, its functions and actions, are subdued to a natural rhythm.

“ Now, my interpretation of neurasthenia is that the rhythm of life is disturbed, and that the nerve-cells, which normally send out certain impulses in a rhythmical manner, lose their control when afflicted by this disease, and rhythm vanishes. The result is that, in response to a stimulus, there occurs a sort of explosion of nervous energy which continues until the cells are more or less exhausted according to the severity of the illness. Take, for example, a case of insomnia. The patient gets into bed ‘ dog-tired,’ but the act of lying down or possibly of touching the bed-clothes constitutes a stimulus and causes an explosion of nervous energy which effectively prevents the patient from sleeping. Only when the explosion is more or less exhaustively complete, will the patient snatch a little fitful sleep.

“ My attention was drawn to this point in a recent case in which the neurasthenia took the form of violent vasovagal attacks resembling angina. I think I may say that the explosions of nervous energy, on the part of some of the nerve-cells connected with the heart, completely puzzled the three highly competent observers whom I was able to consult. I have yet to see the case of neurasthenia that could not thus in some degree be accounted for, if massage treatment were to be the main curative agent.

“ If this is the nature of neurasthenia, then its cure is to be found in restoring to the nervous system the lost rhythm. I believe this may be done by sending up to the diseased cells rhythmical impulses, by means of massage of the variety I have described. Rest alone, mental and

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physical, will sometimes effect a cure by reducing the inimical stimuli in quantity and quality, and so potent is this remedy in suitable cases, that it can even counteract the injurious effects of the heavier forms of massage. But if, rest by itself failing to secure recovery, some curative agent is required, then our one hope rests in the massage treatment for the trial of which I plead.

“My theory is all speculation, but it covers clinical facts. However, I am no authority on the voluminous literature on the subject of neurasthenia, and some such theory may, for aught I know, have been propounded before. All I would suggest is that, should anyone be called upon to deal with an intractable case of neurasthenia of whatever nature, he should bear the three points to which I have drawn attention in mind when devising his treatment. I do not think he will regret having done so, nor will his patient.”

It is possible to give a few general hints as to technique, but nothing more. Every care must be taken to render the conditions for treatment ideal. A part must be chosen for the start where no pain or discomfort has ever been felt, and then the hand should make two or three movements first upwards and then downwards. The expert will be able to tell at once which will prove most beneficial; failing experience, the patient must be asked to decide.

No stimulating movement is to be given, so exposure must be reduced to the minimum, especially when dealing with the legs. One hand can support the bedclothes while the other does the massage.

If the patient can remain prone for a sufficient length of time, it is well to perform the massage of the legs on their posterior surfaces. A pillow must be placed under the ankles so that the feet may rest comfortably (*cf.* position shown in Fig. 13, p. 48).

Five or six minutes' stroking from buttock to heel, or *vice versâ*, should suffice, the rate being some ten or twelve movements to the minute. Each several movement

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should be an exact replica of those which precede and follow it. There must be no variation or deviation.

The back massage must be performed in a line which is exactly parallel to the spine. It should start over the



FIG. 108.—Stroking the back. The left hand is finishing one stroke while the right is preparing to begin. This is a very difficult movement, and requires great skill to attain perfection of rhythm.

high dorsal region and descend to the sacral area, or the reverse. It is rarely wise to use both hands together, one on either side of the spine, as it is almost impossible to maintain the rhythm. It is much wiser to work for, say, three minutes on one side, then three minutes on the



FIG. 109.—Stroking the abdomen with both hands. The beginning of the stroke.

other. The rate of stroke is about the same as that on the leg. The central area over the spine itself then receives attention for about five minutes. The first three are spent in duplicating the movements already performed at the sides, or the number of strokes may be increased—the

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rapidity of passage of the hand must remain unchanged—by the use of the two hands alternately (see Fig. 108). During the last two minutes the hand, or hands, should begin the movement a little lower down the spine (or



FIG. 110.—Stroking the abdomen with both hands. The end of the stroke. It is a very difficult movement to perform rhythmically, and requires much practice. The use of one hand at a time is much more simple.

should cease the movement if working upwards), and the area treated should become smaller and smaller till only the lower lumbar area is treated. The touch becomes lighter and lighter till finally the patient should be barely conscious of its cessation. Success has been attained if the



FIG. 111.—Deep stroking of the colon: nearing the end of the stroke. Note the positions of the pillows.

patient remains motionless for a few moments after treatment has ceased and draws a deep breath before moving.

The arms are treated in a similar manner. They must rest on the bed supported throughout their whole length. The number of strokes per minute will be increased, as they are shorter. The rapidity remains unaltered.

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The abdomen also is treated in the same way, the stroke following the line of the lower six intercostal nerves from the mid-axillary line to the centre of the body (see Figs. 109 and 110). If constipation is present, deep



FIG. 112.—Deep stroking over the dilated stomach.

stroking with one hand up the ascending colon and down the descending with the other may be performed (see Fig. 111). It must be slow and rhythmical and vibrations should not be added. Nothing must be allowed to disturb



FIG. 113.—Stroking the neck: patient sitting. The beginning of the stroke.

the general rhythm of the whole *séance*. A dilated stomach may be treated by transforming the superficial stroking of the right side into deep stroking over the upper part of the abdomen; the hands may work alternately (see Fig. 112). If any deep stroking is to be per-

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formed the knees must rest on a pillow to flex the thighs and so relax the abdominal wall.

Some patients greatly value head massage and respond



FIG. 114.—Stroking the neck: patient sitting. The middle of the stroke.

to it very readily. This particularly applies to insomnia patients. The treatment may be given sitting up or lying down. In either case the stroking should extend from



FIG. 115.—Stroking the neck: patient sitting. The end of the stroke. The back of the patient's head should rest on a pillow or towel, which, in turn, rests against the masseur's abdomen.

the level of the hair to the point where the treatment of the back ceased, and should resemble it in all respects, except that it is quite easy to use the two hands together.

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Treatment of the front of the neck is performed with the two hands, if the patient is sitting, the stroke starting just below the chin and extending right out on to the



FIG. 116.—Forehead stroking: patient sitting. Commencement of the movement.

shoulders (see Figs. 113, 114, and 115). The head rests on the worker's chest. The rapidity of movement must be rather slower than on the trunk, and, in spite of the



FIG. 117.—Forehead stroking: patient sitting. The ulnar borders of the fingers crossing the eyes.

shorter 'sweep,' only ten or twelve movements a minute should be performed. Three or four minutes should suffice.

The forehead may then be treated for a similar, or

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perhaps rather shorter, length of time by each or either of two movements. The first starts from the middle line



FIG. 118.—Forehead stroking : patient sitting. The end of the movement. The patient's head should be supported on a pillow or towel which rests against the masseur's abdomen.



FIG. 119.—Second movement for forehead stroking : patient sitting. The right hand is commencing the movement ; the left is just finishing.

(see Fig. 116) ; the ulnar borders of each finger in turn pass over the eyes with the lightest possible touch (see Fig. 117), and the movement ends over the temples (see

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Fig. 118). The second consists of plain upward stroking from the level of the eyebrows, passing over the top of the



FIG. 120.—Head stroking: patient recumbent. Note position of worker and patient. The movement commences with the passing of the hand over the pillow. This can be made to produce a slight swishing sound, which, being rhythmically repeated, acts as an additional suggestion *via* the sense of hearing.

head throughout its anterior half at least (see Fig. 119). The second movement can be performed equally well, of



FIG. 121.—Head stroking: patient recumbent. The hand pivots round the ball of the thumb which rests over the eye.

course only with one hand, if the patient is recumbent, but the first movement then calls for material alteration, and is easily combined with the down stroking of the

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front of the neck. The worker kneels on the opposite side of the patient to that which is under treatment. The ulnar border of the hand just touches the patient near



FIG. 122.—Head stroking: patient recumbent. The hand has supinated to reach the angle of the jaw.

the middle line of the forehead, and the hand is then pronated so that all the fingers come in contact with the forehead and the ball of the thumb rests over the eye of the patient. On this the hand pivots so that the fingers



FIG. 123.—Head stroking: patient recumbent. The hand pronates to embrace the side of the neck and then sweeps down to the shoulder.

sweep across the forehead, pronation becoming less marked. The ball of the thumb then gradually rises and sweeps across the eye while the fingers descend the face in front of the ear. As soon as the fingers reach the lower

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level of the jaw the hand pronates again and is carried downwards and outwards across the neck to the shoulder. An attempt to illustrate the movement is made in Figs. 120 to 123. This is an excessively difficult movement and calls for great skill. If clumsily performed it is a source of great irritation.

The total *séance* may last up to seventy-five minutes. It is often possible to leave patients sound asleep. Before this stage is reached the patient is frequently in what the psycho-therapists describe as the "hypnoidal state." Verbal suggestion can play its part with greatest effect during the continuance of this condition.

It is impossible to over-emphasise the danger of using the treatment here advocated for neurasthenia in cases of hysteria, unless it is demanded by the physician as a preliminary to suggestion treatment. Used as a purely physical remedy, its great potentialities for good in the neurasthenic become almost equally powerful for ill in the hysteric. For the latter, massage treatment to be effective must partake of the nature of a moral persuasion which is little short of actual punishment. Treatment of this character is a degradation of the art of massage and should be strenuously discouraged. Electricity, on the other hand, affords a physical treatment which can often be used with the greatest of benefit in hysteria. On the individual who is liable to break out into noisy fits of laughter or crying at frequent intervals the static breeze has often a very marked sedative effect. Sparking may effectually allay hysterical aches and pains. High frequency can remove a multitude of hysterical symptoms provided the patient is properly prepared from the psychological standpoint. Faradism, by producing visible contraction, can often convince a patient that movements which he does not perform owing to hysterical "paralysis" are really within his power. This is the scientific method of dealing with these cases. As Buzzard has pointed out, it is untrue to say of the hysteric that he cannot perform an action, it is unfair to say that he will not, and so we must be content with the simple fact that he does not.

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If by Faradism we can ensure that the action *is* performed, we are at least on the road to cure. If, in addition, moral persuasion can induce the patient to copy the movement performed in response to the current, the cure is established.

CHAPTER XX.

THE TREATMENT OF FUNCTIONAL DISORDERS AND OF OTHER CONDITIONS OF UNCERTAIN ORIGIN.

It is beyond doubt that neurasthenic symptoms may develop as a local condition. Treatment must then be carried out on the lines laid down in the previous chapter. But many cases exhibiting similar symptoms are undoubtedly hysterical. Massage by itself fails ; massage combined with other methods of treatment may succeed. It is impossible to furnish any guide as to the manner in which these cases should be approached. Everything depends on the nature of the concurrent treatment.

If a patient with a hysterical paralysis is treated by solitary confinement and other severe measures, probably the best line to adopt is to administer a thoroughly vigorous—and probably equally unpleasant—dose of massage. As pointed out in the previous chapter, this method of treatment should be discouraged. If, on the other hand, the patient is being treated by suggestion, the wisest plan is to apply only the sedative type of massage advocated in the previous chapter, without paying any special attention to the limb that does not move. This will prepare the way for the psychical treatment and help to render the patient more receptive.

Passing on to the treatment of functional disorders in general, we find that a large group of cases have one symptom in common, namely, spasm. This may affect involuntary or voluntary muscle. Raynaud's disease and angina pectoris may probably be taken as typical of the former.

In the treatment of *Raynaud's disease* there should be two distinct methods of attack. First, presuming that the spasm is due to some nerve lesion, reflex result might be anticipated from surface stroking, and this should

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undoubtedly be given a chance. If it succeeds in nothing else it will prepare the way for the second method. This is neither more nor less than so to over-stimulate the unstriated muscle of the arterioles that, despite the command of the nervous system to contract, it is compelled to remain relaxed. Hence firm, deep massage is required, and thirty to forty-five minutes may be spent on the treatment of one limb. The benefit will soon be detected by the patient, and the results recorded in relief of pain, a sensation of warmth, and improvement in colour. The proximal portions of the limbs should be treated before the distal, and every precaution should be taken not to submit a tender area to heavy treatment at the outset, but to approach it gradually. After massage every muscle in the limb should be exercised.

It is probable that *erythromelalgia* and *angio-neurotic edema* are disorders of similar origin. If opportunity affords, treatment should be arranged on the above lines.

Chilblains, in the ordinary household, are submitted to vigorous rubbing. Historical evidence cannot be ignored, and this time-honoured practice must have something in its favour. On the other hand, purely local treatment of this type can only cause a local hyperemia which is transient in character. The scientific treatment for this most annoying condition is to treat the whole limb by general massage for the circulation, aiming to secure, by both reflex and direct effect, a general toning up of the whole of the vascular system of the part. The pathology of the trouble is probably that cold, possibly combined with pressure, has caused a direct spasm of the arterioles. Then, owing to the long-continued presence of the spasm, the muscle fibres have become "fagged out" and temporarily paralysed. There is, therefore, little to be said in favour of attempting further to paralyse them by over-stimulation. An attempt may, however, be made to stimulate the muscle to contract, by the application for very short periods—say ten or fifteen seconds at a time—of vibration or percussion.

In arctic circles true frost-bite is treated by vigorous

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rubbing to secure vaso-dilatation, as, failing this immediate remedy, the cold is liable to freeze the blood in the part that has been depleted of fluid by reflex vaso-constriction.

The "*trench-foot*," with which we first became familiar in this country in the early days of 1915, is due to a combination of causes—usually cold, damp and pressure, and probably also to sepsis. In spite of the cold, the condition is unknown in Labrador, and Dr. Grenfell has attributed the immunity to lack of pressure.

How far the subsequent evils of trench-foot could be avoided were it possible to administer immediate treatment by massage it is impossible to say. When the cases arrive home the condition appears to be a combination of neuritis and of paralytic vaso-dilatation. Certain it is that vigorous massage is a lamentable failure, and definitely postpones recovery.

Treatment should be administered as follows :— Surface stroking of the thigh is begun, and the stroke is gradually lengthened, by including more and more of the leg, until the area of sensitiveness is reached. It is then carried no lower. The thigh is gently kneaded, and then the patient is taught to contract every muscle in the limb over which he has control. Exercise without weight—simple swinging or on the sliding-seat—is encouraged, and the *séance* terminates with surface stroking for about five minutes. Great patience may be required, and careful watch must be kept for the development of deformities, and these should be appropriately guarded against. The chief are foot-drop and the development of a valgus deformity, either of the whole foot or only of the big toe. The use of a club-foot shoe-splint at night (well padded) will probably be all that is required. No patient should ever be allowed to walk till all danger of developing these deformities is past. Gradually the stroking may be extended all over the foot, and then kneading may be applied to the leg with great care. Once more the foot is gradually approached. Sometimes it is possible to administer this treatment to the foot itself

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by grasping it firmly between the two hands and alternately relaxing and tightening the grip. No movement of the hand on the surface takes place (*cf.* Fig. 72, p. 148). If utilised, this part of treatment should occupy only a very few minutes.

Almost every conceivable variety of treatment has been advocated for this condition. It is impossible to compare results, as, apparently, whatever the treatment adopted, some cases succeed rapidly and others fail. The success of the above scheme when other attempts have been made and failed justifies its patient trial, as, even when it has appeared to be the last resource of the destitute, it has ultimately succeeded. Sometimes it too fails ; but any other scheme of treatment by massage is almost certain to fail, and failure is usually accompanied by an aggravation of the condition.

True *angina pectoris* is usually associated with arteriosclerosis. The patient is therefore unable to take sufficient exercise, and general massage for the circulation will be of great service in aiding the elimination of waste products. Any form of local heart treatment is contra-indicated, and every care should be taken to avoid causing the faintest trace of irritation.

In *pseudo-angina* the success of massage may be very great. The trouble is purely neurasthenic, though some hysterical cases may be found to present pseudo-angina as a symptom. The treatment is general, as for an acute neurasthenic attack. It should start with two or three minutes of surface stroking to each leg. Presently the arms receive a dose, later still the lumbar region of the back is treated. The dorsal region is slowly included in the stroke, and finally the head should receive attention. Any attempt at general treatment in the early stages is liable to precipitate an attack. Local heart treatment is absolutely contra-indicated. The patient is likely to be deprived of exercise for some time, and therefore, on resuming walking, is liable to an undue quickening of heart-beat. This in turn is liable to precipitate an attack. Bergonié treatment, by building up muscular strength

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without effort or exertion, is a valuable prophylactic against relapse.

Spasm of the intestines produces colic, and is considered later (see Chapter XXIV.).

Asthma, another disease due to spasm of involuntary muscle, will also be dealt with later (see Chapter XXVI.).

Cases of spasm of the voluntary muscles are seen frequently in any massage clinic. It is often difficult to deal with, and its manifestations are varied.

Roughly speaking, there are four main types—the hysterical, the “functional,” the irritative, and the occupation types.

The *hysterical type* may be illustrated by the case of a girl who wanted her parents to buy her a bicycle. The request being refused, walking became painful, a limp developed rapidly, due to the heel being kept raised from the ground, and the result after a few days was fixed spasm of the calf muscles. No amount of massage could ever correct the deformity without the aid of psychical treatment. Strict nursing, confinement to bed, no luxuries, and removal from home furnished this element : under gentle stroking, combined with light continuous pressure on the sole of the foot, the spasm was relieved and re-education was possible. Though the condition was of many months' duration, cure was effected in a few weeks. It is possible that the actual cautery applied over the front of the ankle might have been equally efficacious in as many hours. Moreover, the treatment was not without risk. Had it failed, the severity of the symptoms would doubtless have been intensified.

“*Functional spasm*” is, as a rule, far more easy to cope with. There is one great exception, namely, the spasm which many small children develop after injury and splintage. The most troublesome type of all is the small child of three or four, who has sustained fracture near the elbow-joint, and who has been treated with the elbow fully flexed. It is no uncommon event for spasm of the

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biceps to limit extension to a right angle. Many recover spontaneously if allowed merely to play with the arm; a few who do not do so require great care and patience. Massage is of little avail, but skilful playing with the child will succeed. It is a difficult art to learn, and the key to success is patience. Force is fatal.

As a general rule a functional spasm is far more easy to deal with by massage than is hysterical spasm, because in the latter the sub-conscious mind is aware that there is nothing to cure, whereas the conscious mind is thereby all the more ready to resist cure. Functional spasm, on the other hand, almost universally springs from injury or strain of some sort, and is, strictly speaking, a localised neurasthenia. Slow, rhythmical stroking of the surface, passing by infinitesimal stages into firm, deep stroking, will almost invariably relieve the spasm. The moment it begins to subside constant pressure is exerted very gently, so as to "take up the slack" as it were, and thus movement of the joint that was fixed by the spasm can be performed (*cf.* Fig. 107, p. 210). The disability being of the conscious mind, there is no quarrel between this and the sub-conscious. Thus we find that the performance of the movement convinces the patient of its possibility, and, as soon as active exercises can be performed after the spasm has been overcome, the patient is on the high-road to recovery. Temporary relapse is common and of no importance, provided the patient is taught to expect it.

A form of spasm, usually regarded as of rheumatic origin and possibly irritative in character, is one of the symptoms of *chorea*. It is still an open question whether the disease may not be solely a functional brain disorder. Whatever its origin, the psychological disturbance is always considerable and may be very grave. The treatment applicable, therefore, is similar to that advocated for the treatment of neurasthenia. The chief alteration that should be made is materially to reduce the duration of the *séance*, though it may well be repeated twice during the day. There are two reasons for this reduction—first, that the disease is most commonly met with in children,

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who are much more amenable to the effects of reflex stimulation than adults ; and, second, that the instinctive effort to control the movements during the *séance* is exhausting. Massage, correctly administered, is perhaps the most effective weapon we possess in combating spasm in this disease ; but if it is inefficiently performed the result can only be disastrous.

A common type of irritative spasm is provided by the patient who develops a *spasmodic torticollis* as the result of pediculi in the hair. The spasm is of a clonic type, and is much more amenable to treatment than in those cases which present tonic contraction. The patient should lie on one side with a roll placed under the sound side of the neck, leaving the head itself unsupported. Surface stroking is soon replaced by deeper stroking over the sternomastoid and trapezius, and this, in turn, should be replaced by gentle kneading. It is important that this should be rhythmical, as every endeavour must be made to avoid causing the smallest trace of irritation. When the spasm has been relieved, or at least ameliorated, the patient may sit up. Downward neck stroking should be performed on both sides (see Figs. 113 to 115, p. 225) as a preliminary to the administration of resistive exercises to the muscles of the sound side of the neck. Success will depend on two factors—first, on the possibility or otherwise of the removal of the source of irritation, and, second, on the duration of the complaint.

Torticollis in which the spasm is of the tonic variety should be treated on similar lines. As a rule, however, treatment is used either to prepare the patient for operation or to restore the parts after operation. In the latter instance, exercises to strengthen the muscles of the opposite side are usually the most important part of treatment. Gentle massage may be used to prevent extensive cicatrisation at the site of operation.

The type of *occupation spasm* most frequently encountered is writer's cramp. Any occupation that entails

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incessant use, or rather over-use, of any muscle is liable to produce a similar spasm, particularly when the muscles concerned are used in the performance of some highly specialised movements which entail elaborate co-ordination. It is not uncommon for watchmakers to lose the use of their hand from spasm, and recently what might almost be called the "marcher's cramp" has been an object of great interest, but of considerable anxiety. The recruit who has "never done much walking" starts out on a route march. His heel begins to pain him, and he finishes the march on the toes of one foot. The calf then develops a most intractable spasm. It may be that the deformity produced is a pure equinus; more usually it is an equino-varus. A suitable position for treating this condition is shown in Fig. 107, p. 210. From time to time we hear of a masseuse's cramp, but this can only be due to lack of skill in the exercise of her profession, and neuritis is more common. Excessive practice can produce a musician's cramp.

Of the true occupation spasms it may be said that, by means of massage and exercises, there is an almost sure hope of successful treatment. There are, however, many forms of pseudo-occupation spasms. A victim of hysteria may develop an intense writer's cramp during, or after, the composition of a "difficult" letter; while the trouble referred to above as "marcher's cramp" has frequently a large psychical element. The treatment of the "pseudo" variety of occupation spasms by massage alone is almost certainly doomed to failure. Physical remedies rarely suffice for the cure of psychical disturbance.

A true writer's cramp may extend to very serious lengths, for, when the trouble is far advanced, all power of co-ordination in the limb may be completely lost, and the patient may suffer agonising pain from cramp, though actual pain is not by any means a common symptom. There may be vaso-motor changes, and the appearance of the hand may even suggest serious nerve-lesion. This is of course a rare development. Usually the symptoms

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are confined to weakness, tremor, and lack of co-ordination for the movement concerned, while all other movements can be performed with perfect ease, comfort, and strength.

Massage should begin with surface stroking from wrist to shoulder for a few minutes. Then the muscles of the arm are given a short dose of kneading, which should impart a shaking movement to the muscles. Some five or six minutes from the commencement of the *séance* rhythmical kneading of the forearm should be under-



FIG. 124.—Massage of the hand in treatment of writer's cramp.

taken ; but here no shaking is allowed, at least during the early stages, as it is liable to excite spasm.

Presuming that the right arm is under treatment, the masseur next takes a firm grasp of the patient's thenar eminence with the right hand, while his own thenar rests in the patient's palm. The left hand is then placed firmly over the dorsum of the patient's hand (see Fig. 124). The hands next exert gentle intermittent pressure and subsequent relaxation, but do not change their position relatively to the patient's skin. With the closing of the fingers, however, the first carpo-metacarpal joint is

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mobilised by the right hand, while the palm is rendered fully concave by pressure from the back by the left hand. As soon as this can be accomplished freely the fingers can be flexed as well. At first no movement may be noticed, but as treatment progresses an ever-widening range of movement will be secured. It should be needless to add that every care must be taken to avoid inflicting pain or even discomfort. Full exercises of shoulder and elbow, particularly of the rhythmical swinging type, should be prescribed. Later on weight and pulley or roller exercises may be indulged in with freedom. In short, any exercise may be prescribed which does not excite the spasm, and the limb should be used with all the freedom that circumstances will allow.

As soon as it is possible to use the vibrator without exciting spasm, progress will be more rapid.

When the hand can be used with relative freedom for everything except actual writing, the patient may be presented with a thick piece of chalk, with which to practise writing very large "copper-plate" letters on a black-board. The size of the letters is gradually reduced, and the patient is provided with a pencil. The same plan is carried out once more, and the following examples will serve as a guide. They are quoted from Graham's "Massage":—"The patient is directed to make large L's quickly and continuously, followed by the reverse of these, making m's, so as to make him write from the upper arm and shoulder." The size is gradually decreased, and the next exercise "consists of 'lelele,' large and rapid at first, then gradually diminishing, and later the exercise 'leglegleg' many lines at a time." A wise additional manœuvre, when starting, is to pad the penholder in such a manner that its bulk can be slowly reduced day by day.

Every variety of occupation cramp calls for suitable modifications of treatment. The use of massage is to enable the patient to practise exercises which alone can effect a cure.

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A peculiar form of spasm of unknown origin is found in *Parkinson's disease* (paralysis agitans). The pathology of the disease has not been worked out ; the symptoms may be classified, in a word, as corresponding to the advent of a premature old age. The muscles slowly lose strength and contract slowly. The tendon reflexes are brisk. The arms become stiff from being kept almost motionless, the legs tend to develop contractures in the hamstrings, the shoulders become bowed, and a most distressing tremor develops in some cases, not in others. Where tremor is absent the form is known as *Parkinson's disease sine agitatione*.

The masseur's duty is plain. It consists of maintaining suppleness throughout the body by means of relaxed and assistive movements, and of rendering assistance to the circulation, which the patient cannot derive from nature's own means, namely, exercise. General massage of the whole body, chiefly of the kneading type, will be required. Abdominal massage should aim chiefly at assisting the portal circulation. Unstriped muscle seems to be unaffected by the disease, but the spread of the disease to the abdominal muscles may render defæcation difficult. Massage adapted for the relief of constipation may therefore prove of value.

CHAPTER XXI.

THE TREATMENT OF DISEASES OF THE CENTRAL NERVOUS SYSTEM.

Hemiplegia is one of the most disheartening conditions that the massage worker is called upon to treat. There is, however, this much of comfort for us, that, without our aid, the patient's condition would pass from bad to worse. Occasionally it will fall to our lot to watch a patient make actual progress towards recovery, and the gratitude received will amply compensate for any trouble taken. The patient invariably attributes to the massage any recovery that may be made, and to a certain extent he may be justified. Nature should, however, receive her meed of thanks.

It is true that, generally speaking, the right side of the body receives its innervation from the left side of the cerebral cortex, and *vice versâ*. But there are intercommunicating fibres from one side to the other, and it would seem that sometimes the left side of the brain can develop a certain amount of control over the movements of the left side of the body. Patient perseverance with massage and passive movements—of necessity they must be relaxed—are able to keep the paralysed muscles in readiness for these connecting fibres to play their part. Without our assistance the communications would doubtless take place, but the muscles would not be able to take advantage of the recovery. In any case of hemiplegia it is always doubtful at the outset how far recovery will be partial or complete ; as, even if the lesion is small, paralysis may be very marked in the early stages, apparently from “shock” sustained by neighbouring structures.

The duty of the masseur is again obvious. General massage of the deep-stroking and gentle kneading types

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will maintain nutrition. Passive movements will prevent contractures. Each joint must be treated fully and conscientiously every day. Should there be signs of returning power, the patient will often contract the muscles more readily if slight resistance is offered.

It is well to remember that the patient may have been leading a most active life right up to the moment of the onset of the "stroke." The sudden cessation of full activity is always detrimental to general health, and abdominal massage may add very materially to the patient's well-being. In the earlier stages, however, abdominal massage should be administered with a very sparing hand in all cases of cerebral hæmorrhage, as it tends to raise the blood-pressure.

The psychological aspect of the case should also be kept in mind. The visit of the masseur should be a bright spot in the daily routine, and the moral support given in a hopeless case may be of as great importance as any physical benefit that may be rendered.

During recovery of a muscle great care must be taken to avoid fatigue from over-use, and exercise must be duly "spaced" with massage (see p. 185).

Progressive Muscular Atrophy is another of the "hopeless" diseases, in which massage and exercises, though they will not cure, can help very materially. The form usually encountered is known as *amyotrophic lateral sclerosis*. Generally it begins with "clumsiness" in performing some of the finer hand movements, and spreads continuously. In the early stages massage and exercises may effect an apparent cure. This is only because the disease has still left sufficient motor fibres intact to enable us to build up the strength of the muscle fibres supplied by them to such an extent that, through their increase of strength, they are enabled to do their own work so well that the degeneration of neighbouring fibres passes unnoticed. It is a "losing game" in the end, but the masseur who keeps heart throughout the

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fight may confer inestimable benefit on a patient who, without massage, is deprived of all hope of assistance.

Massage should aim at maintaining nutrition and assisting the performance of exercises. Fatigue must be carefully avoided. All joints must be kept fully supple, as only so can the typical *main-en-griffe* deformity be averted. Contractures should be countered by every means available. The upper motor neurone may be more affected than the lower. This leads to a spastic paralysis instead of a flaccid. The difference in treatment is as follows :—

In all cases of *flaccid paralysis* wasting of the muscles is rapid and complete, and all reflexes are lost. In *spastic paralysis* the muscles may waste very little, and the muscle reflexes are all exaggerated. This gives the clue to treatment. In flaccid paralysis the muscles are in a condition of absolute relaxation and are undergoing degenerative change. The sole aim in performing massage is to secure full and efficient circulation through the muscle, for the double purpose of maintaining nutrition and of removing waste products. These inevitably collect in spite, and even because, of lack of exercise. Without exercise the normal stimulus necessary for an efficient blood supply is not provided ; deficiency of blood supply in turn allows waste material to accumulate ; and this accumulation again tends to hasten the degeneration of the muscle tissue. Hence we have a vicious circle, which can well be broken by means of massage. But the perfect flaccidity of the muscle deprives every structure in, or covered by, the muscle of the natural protection which is derived from it when the tone is normal. Hence we may regard our massage as applied directly to the blood-vessels. Keeping in mind the delicate nature of the arterioles, and that the influence of massage on these vessels is due to the response of the unstriated muscle in their walls to mechanical stimulation, it is easy to realise how simple it is to overdo massage treatment in these cases. Any excess leads to paralytic dilatation, which means that the stagnation of the circulation—

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already present to some extent as the result of the paralysis—is increased by our manipulations, and thus the very evil that we are attempting to remedy is actually enhanced. There should, therefore, be three main laws in the treatment of flaccid paralysis: first, the dose of massage administered to any individual muscle, or muscle-group, should be short, but may be repeated on the same day; second, only the most gentle and delicate touch is permissible; third, every care must be taken to avoid pressing the paralysed fibres between the fingers and the bone.

It should be borne in mind that the very fact that a muscle is in a condition of flaccid paralysis is an indication of deficiency in the nerve supply to the unstriated muscle of the arterioles (which provide the muscle with blood). In cases of spastic paralysis this is not so, and therefore less care and caution is called for in treating these cases. Moreover, in such cases the muscle tone is exaggerated rather than diminished, even though the actual bulk of the muscle has diminished from lack of exercise.

Hence we see that in treating spastic paralysis we still aim at securing the same objectives, namely, to maintain nutrition and remove waste products, but that the danger now lies in inciting irritability in the muscle fibres by our manipulations. The most delicate stroking, picking-up, and possibly kneading over small areas, are therefore replaced by a firmer touch, as wide an area as possible being treated at the same time. The movement may be deep, but must be slow and even. Stroking should be firm, and a long sweep should be employed instead of the delicate movement of small amplitude advocated for the treatment of flaccid paralysis. The picking-up and kneading should be performed with the full grasp of as much of both hands as may be possible, instead of attempting to treat each minute section in turn.

In both flaccid and spastic paralysis treatment should aim at securing perfect mobility at all joints; but in flaccid paralysis every care must be taken never to stretch the paralysed muscle, whereas in spastic paralysis the

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difficulty will be to secure an adequate amount of movement without exciting spasm.

The value of massage in restoring muscular vitality has been proved experimentally by Zabłudowski. He found that, when a muscle had been completely exhausted by repeated contractions in response to Faradism, subsequent rest had relatively little effect in restoring the power of contractility. After kneading this power returned very swiftly, presumably because the waste products of muscular metabolism had been dispersed.

Moreover, Castex has shown microscopical evidence of the beneficent influence of massage on muscular tissue after injury. Lucas-Championnière thus epitomises the evidence :—

Similar injury having been inflicted by crushing, massage was applied to some cases, not to others. The latter showed :—

- (i.) Dissociation into fibrillæ of the muscular fibres, as shown by well-marked longitudinal striation ;
- (ii.) A hyperplasia, sometimes a simple thickening of the connective tissue ;
- (iii.) An increase in places of the number of nuclei in the connective tissue ;
- (iv.) Interstitial hæmorrhages ;
- (v.) An enlargement of blood-vessels, with hyperplasia of their adventitious coats ;
- (vi.) The sarcolemma was usually intact, but, in one section, a multiplication of nuclei was seen, giving an appearance somewhat resembling an interstitial myositis.

In the massaged limbs :—

- (i.) The muscle appeared normal ;
- (ii.) No secondary fibrous bands separated the muscle fibres ;
- (iii.) There was no fibrous thickening around the vessels ;
- (iv.) The general bulk of the muscles was greater ;
- (v.) There were no signs of hæmorrhages.

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In *syringomyelia*, as in progressive muscular atrophy, the masseur can often alleviate, though he cannot cure. By general massage of the deep stroking and rhythmical kneading varieties it is possible to relieve the irregular pains and even perhaps to postpone the loss of thermal and tactile sensibility.

In the paralysis that follows an attack of *acute poliomyelitis* the muscles affected are perfectly flaccid. Treatment by mobilisation and massage should be commenced the moment pain and fever have abated. Delay is disastrous for two reasons: first, it is easier to prevent contractures than to cure them, and, second, while it is possible to keep any muscle fibres which will eventually recover properly nourished, the difficulty of the task is greatly increased once their vascular supply has been allowed to degenerate.

It is a well-known fact that, however complete the paralysis may seem to be at first, some return of power at a fairly early date is usually to be expected. In other words, the fibres are paralysed, not by disease of the nerve cells to which they owe their innervation, but because these cells are in close proximity to others which have suffered. It is possible that the cells are temporarily paralysed by the local inflammation around them.

Now we know that the "Saturday night paralysis" is rarely due (as a previous generation has thought) to pressure on the musculo-spiral nerve. It is usually to be attributed to falling asleep with the wrist resting in a position of extreme flexion. This forcible extension of the extensor muscles continued for only a few minutes, as anyone can test for himself, produces a decided weakening. This soon becomes more serious, and no great length of time need elapse to deprive the muscles of their power of contraction.

The great danger run by a victim of poliomyelitis is that certain muscles which control a joint being unable to contract, the antagonists, by their natural tone, tend to

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stretch them. If the stretching of a healthy muscle can produce a complete paralysis, how much more can a similar effect be produced in a muscle which is deprived for the time being of its innervation! Every attempt should therefore be made from the outset to relax each muscle that is paralysed, and to prevent its antagonist from contracting. If this is done, massage can maintain nutrition until the time arrives that any nerve-cell, which has not been actually diseased, can resume its function.

In this way, and in this way only, can the patient be assured of regaining forthwith the fullest possible restoration of power. If relaxation is not secured from the outset, we have postural paralysis added to the real paralysis; and if massage is not employed, the nourishment of the muscle is not maintained, and wasting is rapid. Even granted postural treatment, the muscle fibres, supplied by the nerve fibres which survive, will, without the aid of massage, lack greatly in nourishment and, therefore, vitality.

Nothing need be added to what has been said as to the technique employed in treating flaccid paralysis, save to emphasise once more that no paralysed muscle should be allowed to stretch.

When strength is returning, great care must be taken never to fatigue the muscle. The patient should make a single contraction and massage should be resumed. Three or four twitches throughout a complete *séance* will be sufficient at first. Then, as strength returns, the number of contractions is increased, with massage between each, till presently several movements can be performed consecutively. When strength allows of the commencement of exercises, the "spacing" of the contractions must be continued, each exercise being preceded, and followed, by massage.

Inevitably the day will come when some movement or exercise cannot be performed with a freedom equal to that of the previous day. This is a sure sign that an attempt is being made to push progress too rapidly, and the correct treatment is to maintain the muscles in a

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position of complete relaxation for one or two days. Massage only should be given meantime, and the exercises should be resumed gradually.

Anyone who has had experience in the treatment of

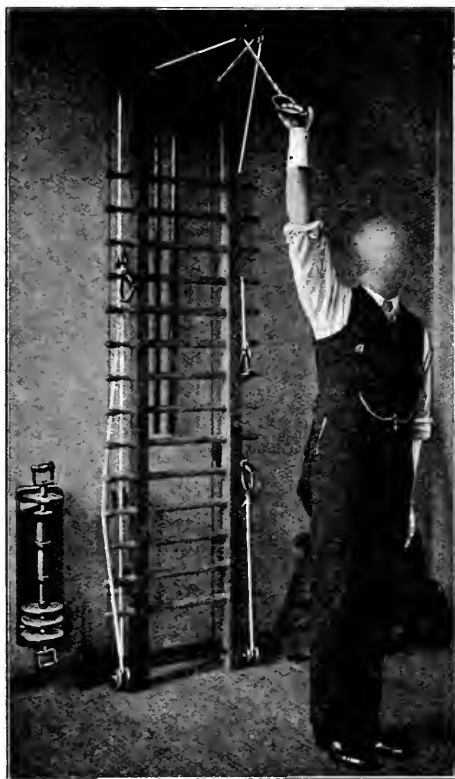


FIG. 125.—To show how a patient wearing a cock-up splint, and suffering from musculo-spiral paralysis, may exercise his arm with the weight and pulley. All exercises must be performed with the back to the apparatus.

this type of case, and who has never overdone treatment, may be assured that he has not rendered full assistance to his patients; while he who has never acknowledged that he has given an excessive dose, and eased off in consequence, has assuredly inflicted great injury on some

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of them. In fact the test of proficiency in re-educating a case of flaccid paralysis is the ability to determine the exact moment at which rest is preferable to perseverance.

Throughout treatment all joints must be kept supple by giving relaxed movements, and every area of the body that is not affected should be exercised regularly and freely. During movements or exercises no paralysed muscle must ever be allowed to stretch, so that great care and ingenuity are called for in prescribing. A splint on a limb need not prevent exercise, for it is always easy to attach a cord from the weight and pulley apparatus to a bandage which is keeping the splint in position (see Fig. 125).

All other forms of flaccid paralysis should be treated on similar lines, *e.g.*, when due to acute myelitis or syphilitic changes. When the origin of the trouble is due to pressure by tumours or is the result of caries the outlook is very poor; but whenever gummatous change is the cause we can maintain the nutrition and mobility of the parts affected till such a time as recovery has taken place. Without this assistance the recovery of the central lesion might be in vain as regards restoration of function.

When a nerve has been severed and sutured the treatment of the paralysed muscles is similar in all detail to that prescribed for poliomyelitis. It is important to remember, however, that the fact that a nerve has been exposed by an incision renders it liable to be caught in scar tissue. Hence our duty is to apply local treatment to the scar.

For the first three weeks after operation every care should be taken to avoid performing any movement which tends to irritate the granulation tissue which holds the wound edges together. Neglect of this precaution will add to the formation of cicatricial tissue. It is usually unwise to vibrate the area until six weeks have passed.

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Reference has been made to the treatment of *postural paralysis*, the example selected being wrist-drop from hyperextension of the extensors of the wrist.

This trouble should be treated exactly as if a true flaccid paralysis were present. Duration of the trouble will be short if the wrist is constantly maintained in the extended position ; it may be very lengthy if the wrist-drop is allowed to persist. When strength is returning gentle percussion, preferably clapping, for a few moments at intervals during treatment, may prove beneficial, particularly if the disability has been only partial and transitory. Pressure paralyses will be considered in the next chapter.

Disuse atrophy may simulate a complete paralysis, and may even lead to a wasting that is apparently complete. The reaction of degeneration is usually well marked if the disuse is of long duration. It is impossible to say where the lesion exists, but certain it is that there may be a complete break in the continuity of the conduction of impulses from the centre of volition to the muscles. It may be that it is possible for a muscle, so to speak, to forget how to respond to impulses that reach it. Whatever may be the cause, treatment should follow on the lines laid down for that of the postural paralyses. During the recovery stages percussion may play a prominent part, if the atrophy is not advanced.

A victim of *disseminated sclerosis* is indeed to be pitied. Unless taken by some intercurrent illness, he inevitably becomes bedridden ; though, fortunately, by this time the mind is usually dulled and the patient unable to resent the condition.

Actual paralysis rarely develops, as the disease is one which affects the neuroglia cells, and the axons merely suffer from pressure.

The earlier stages are often distressing, as the youthful

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patient battles against the onset of vague symptoms. It is typical of the disease that its progress is in waves, so that downward progress is always followed by improvement, though the patient never arrives again *in statu quo ante*. The aid of massage is invoked at the onset of the downward wave, and soon the upward follows. The patient gives all the credit to the massage ; and it is well humbly to accept it, as it provides the patient with a sure hope of relief in future attacks.

Indeed, massage can help the patient, even though it cannot cure, or even check, the progress of the disease. The general vitality is low, digestion often impaired, the bowels often act with difficulty, exercise fatigues, and the patient tends to become generally "flabby," and often at the same time puts on fat. He therefore suffers the additional evils of atonic dyspepsia, constipation, enfeebled circulation, and adiposity. All these can be remedied by massage. There are sundry other minor complaints which can also be relieved entirely, and amongst these are obscure aches and pains that arise from time to time.

In giving general massage for the circulation it should be remembered that the muscular tone is always increased, and that every care must be taken to avoid exciting reflex spasm. Thus the limbs must be placed so that the muscles are completely relaxed, and only rhythmical movements are allowed. Percussion in any form is contra-indicated.

The intention tremor is often a great source of annoyance to the patient. Much can be done to alleviate it by re-education on lines similar to those advocated for the tabetic. The name of the disease (disseminated) implies that the sclerosis does not affect all the nerve elements. Those that escape can be educated to control, or even to do the work of, those that are damaged, during the earlier stages of the disease.

Tabes dorsalis or *locomotor ataxia* is a disease of the posterior roots and of the dorsal columns of the cord.

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In other words, the afferent (or sensory) system is at fault. Thus the patient loses sensation, and when this has departed from the feet he can only control their movements by the use of other senses. For instance, in walking the patient often learns to watch the action of his feet, as he is unable to detect, from his leg and foot sensation, what the limb is doing. But some of the patients develop optic atrophy and may go completely blind. Then the ataxic symptoms vary conversely with the severity of the visual defect. Thus a blind tabetic only becomes ataxic at a very late stage. He loses sensation in his legs as does the sighted patient ; but, having lost the use of the eyes, all the other sensory tracts are so thoroughly developed that between them they can arrange an effective substitute for vision. Then, as the controlling arcs are still all within the body, the ataxia is less marked than if a portion of the arc (as represented for example by the space between eye and foot) is extracorporeal.

If it is possible for a blind tabetic to master his ataxia by the instinctive training of other senses, it is equally possible to teach a sighted patient to do likewise. This is the axiom underlying Fränkel's treatment of locomotor ataxia. Details of the technique cannot be given here, but one word of warning may find place. It is a mistake to try to "go too quick," and to begin re-education of the finer movements before the coarser are fully mastered. It is safe to add that massage and resistive movements, "spaced" into the performance of the exercises, provide an accessory of the utmost value to the patient.

But the ataxia is only one portion of the trouble, and often the least troublesome to the patient. Pain—usually referred to by the patient as "shooting" or "lightning" pain—may be very distressing. In the limbs great relief follows massage, and it may even act as a prophylactic. The same may be said of many of the various sensory disturbances of which the patient is liable to complain.

If the pain is acute, stroking massage should open the *séance*, first of the surface only, then with gradually

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increasing pressure. If only anæsthesia, or a sensation of discomfort, is present, the stroking may be omitted, and kneading be administered from the outset. Gentle percussion or vibration should follow, and stroking terminates the programme. The *séance* should be short, five to ten minutes being ample for the treatment of each segment of the limb.

There may be great weakness of the leg muscles, and especially of the anterior tibial group, though the wasting is rarely proportionate to the feebleness of contraction. The "paralysis," in other words, is dependent on disuse atrophy. This may advance till response to Faradism is very poor. Gentle percussion with the finger-tips may, even then, assist contraction very materially.

Treatment for the general condition is also called for, and great benefit can be conferred upon the patient. It may even be possible to restore *la joie de vivre* to one who seems to have lost it for ever. The agent to employ is general massage to the four limbs, and abdominal massage to assist the portal circulation and to stimulate peristalsis.

For the gastric crises percussion of the spine has been advocated, and it is well worthy of a trial.

Graham, in his text-book on Massage, gives an account of the experiments of Hegar to elucidate the stretching effect of trunk movements on the spinal cord. It appears that the stretching may be very material. It is an acknowledged fact that suspension by the neck has a very beneficial effect in tabes dorsalis, though the *rationale* of the treatment is not evident. We can only suppose that the contents of the vertebral canal are subjected to a stretching process. If this is the remedial agent, then full trunk exercises should be prescribed for all tabetic patients.

CHAPTER XXII.

THE TREATMENT OF NEURALGIA AND NEURITIS.

It is seldom that *neuralgia* occurs as a separate entity; it is usually a symptom of some coexistent malady. General debility is the most common, and, owing perhaps to its devitalising powers, cold should be given second place. A third common cause is chronic irritation—*e.g.*, the facial neuralgia due to sepsis connected with the teeth. It may also be a symptom of neuritis, provided the nerve involved contains sensory fibres.

It is obvious, therefore, that massage treatment for neuralgia is only calculated to relieve and not to cure; but relief is important, and massage, used as a means to this end, is a very potent remedy.

Like most ailments, neuralgia may be acute, sub-acute, or chronic. In the acute stage the slow, gentle, rhythmical surface stroking offers the best chance of success, and seldom will it fail to alleviate. If it does fail, all massage is contra-indicated. The relief of pain renders it certain that no serious organic lesion (*e.g.*, an intra-cranial tumour) is present; failure is a strong indication that prolonged and thorough search should be made for the cause of the trouble.

When the pain is subsiding, or during the sub-acute stage, the stroking may be rendered more firmly towards the middle of the treatment, becoming purely superficial again at the end. No other forms of massage should be used until the chronic stage is approaching or has actually been reached. It will never come except as the result of one of two causes. Either the neuralgia is due to chronic illness, or to changes in the sheath as a sequel of neuritis. In the first instance relief will be secured by

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the means already suggested ; in the second, success will depend on removal of the irritant.

Neuralgic pain, even in the chronic stage, may be sharp with acute acerbitations, or a dull chronic aching. In either case, general kneading of the parts around will aid the vascularity of the part, thus hastening the removal of waste products, and will tend to stretch any minute adhesions that may have formed between the sheath of the nerve and surrounding structures.

Percussion may be a valuable asset, but care must be taken that only the areas supplied by the nerve trunks affected are included in the treatment, otherwise the sedative effect in them may be counteracted by the irritative effect on their neighbours. This is not on account of the violence of the treatment—indeed, it should be performed with the greatest delicacy of touch—but because adjacent nerves are sure to be in a condition of irritability, which percussion would be calculated to augment. In using percussion, the movements should be slow if the pain is acute, or rapid if the pain is dull. Thus the mechanical vibrator will succeed best when treating neuralgia of the latter type. When any definite “ knotty ” points can be felt on the course of the nerve, local nerve frictions are of great service. They should be applied for short periods only, and as an addition to treatment rather than as a complete remedy.

Prognosis depends on the conditions present. If the cause is still operative—*e.g.*, if anæmia is marked—alleviation is all we can hope for. If the general debility is transient—*e.g.*, if the neuralgia occurs during convalescence from some prolonged illness—alleviation may amount to cure. If there are obvious changes in the nerve-sheath, or if the pain is due to the presence of adhesions, it is right to encourage great expectations. In fact, these cases frequently afford opportunity for sensational cure. If treatment is not successful from the outset, it is useless to continue ; success, however small, should encourage perseverance. Thus it may be possible to save a patient from nerve section or

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stretching, whereas no amount of perseverance may ever give a second's relief to a sufferer from the after-pains of herpes.

Neuritis is the name given to all inflammatory conditions of nerve-fibres. It may affect motor or sensory nerves, and may be multiple or local.

Multiple neuritis is a symptom of chronic poisoning. It may appear as a sequel to certain diseases, the most common being diphtheria ; or it may be due to continued dosage of poison—alcohol, lead, and arsenic being the chief offenders. The poisons that accumulate in the body during the later stages of all chronic illnesses may produce a multiple neuritis, and even over-exertion may suffice.

Whatever may be the origin of the trouble, the outlook in cases of multiple neuritis is usually good, though where it follows diphtheria the condition may be very grave and even fatal. Treatment should be conducted on lines similar to those mapped out for the treatment of flaccid paralysis. Alcoholic neuritis may be accompanied by the most intense pain. When this is present treatment must be postponed, as no form of massage can be tolerated. The whirlpool bath might give relief ; it certainly merits a trial. If successful, it would often save many months of wearisome inaction, during which wasting steadily progresses. When the pain is subsiding, downward surface stroking can be used long before any other form of massage. This prepares the way for other methods. Passive movements should be administered to all joints regularly. Strict obedience to the law, that no paralysed muscle is ever to be allowed to stretch, will effectively prevent the onset of contractures. In all cases of multiple neuritis it is, for some reason unknown, wise to give a much more guarded prognosis for recovery in the case of the long extensor of the great toe than in the case of any other muscle.

It is probable that the neuritis which follows the

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prolonged absorption of arsenic or lead can be benefited in two ways by massage. Local treatment maintains the nutrition of the muscles, and so keeps them in readiness for the day when the innervation is re-established. General treatment, by assisting elimination of waste products, also hastens the excretion of the poison. Thus in all cases of arsenical poisoning, or of plumbism, general massage should always be given as well as local treatment, and special attention should be paid to assisting the portal circulation.

Local neuritis of motor nerves is due to cold, trauma, or involvement in the general inflammation which is spreading from surrounding structures.

Bell's palsy furnishes the most frequent example of neuritis due to cold. The paralysis is sudden and complete, and the wasting of the facial muscles is very rapid. Massage treatment is usually postponed for a month or six weeks from the onset. The theory is that the nerve trunk, being inflamed, should not be subjected to manipulation. Probably this is true, but it is no reason why the nutrition of the paralysed muscles should not be maintained. Moreover, in spite of the fact that the face is affected, it is quite possible to maintain most of the muscles in a state of relaxation. A small hook placed at the angle of the mouth and attached to the top of a similar hook running behind the ear will prove of the greatest assistance. Massage as prescribed for flaccid paralysis should be given, and, during the stage of recovery, exercises should be prescribed while the patient stands in front of a looking-glass. Assistive and even resistive movements can be given with ease. Prognosis depends, as a rule, largely on the duration of the paralysis before treatment is begun. Recovery may take place even after the trouble has persisted for twelve months. Throughout the early stages the region of the nerve-trunk should be avoided. In the later stages vibration over the mastoid process may be used, in the hope of loosening any adhesions that

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may have formed in the Fallopian canal. This treatment should be postponed till at least six weeks have elapsed since the onset of the paralysis.

Paralysis due to *traumatic neuritis* of recent origin should always receive immediate treatment. The injury may be due to a blow on the nerve, the ulnar nerve in every-day life, and the facial nerve after the performance of a mastoid operation, affording frequent examples. All forms of crutch and stick paralyses are also due to traumatic neuritis. Again, the nerve may receive a severe contusion without suffering direct injury, as when a bullet passes through the thigh close to the sciatic nerve.

The paralysis is immediate and of the flaccid type, and its completeness depends on the severity of the injury. Treatment should follow the lines already mapped out for this type of paralysis ; but, if the trunk is that of a " mixed " nerve (as is almost invariably the case), treatment will be modified by the neuritis of the sensory element. The return of the motor power is rapid and complete, provided that complications do not arise as the result of the involvement of the nerve in cicatricial tissue.

Traumatic neuritis of a sensory nerve is often very troublesome to deal with, particularly during the stage of recovery. Soon after the accident treatment should follow the same lines as that mapped out for all recent injury, namely, local kneading to check hæmorrhage and to prevent further effusion, followed by the application of a thick pad of wool in the form of a tight bandage. General surface stroking concludes the *séance*.

When effusion has taken place, surface stroking is succeeded by kneading of the limb, the tender area being slowly approached. Over this area a broad grasp with the palm of the hand, and gentle kneading without actually moving the hand on the surface, will be more readily tolerated than local kneading, say with the two thumbs.

Presuming sensation to have been destroyed, there will be no great difficulty until recovery is taking place. Then the treatment must be regulated by the condition.

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Some patients suffer a dull, constant, aching pain, and surface stroking will prove to be all that is necessary. Care should be taken to avoid sensitive spots during the earlier stages. These are slowly approached as sensitiveness decreases. Other patients suffer no pain unless the part supplied by the nerve is touched, when even the touch of clothes may be painful. For this type of case, stroking is useless, but a firm grasp and firm kneading often afford great relief. In a third type no form of massage can be tolerated, and then the whirlpool bath may prove invaluable.

In the later stages, any time after the lapse of four to six weeks, vibration should receive a tentative trial, particularly if any thickening of the nerve can be detected, or if pressure or tension at any point gives rise to pain. The vibrations should begin some distance away from the painful area and should gradually approach the spot. If the nerve is deep-seated, shaking will have the desired effect. Frictions over any definite nodal swelling will sometimes prove effective when every other movement fails, but the movement should be started very gently and the pressure be carefully graduated.

One cause of *brachial neuritis* calls for special mention. It is frequently overlooked, and is easily cured by massage, provided too long a time has not been devoted to other remedies. It is a form of pressure neuritis, and is due to carrying the shoulders too low and too far "set back." It is usually accompanied by lordosis. It would appear that the clavicle, being depressed and carried backwards over the first rib, decreases the space, between the two bones, which is occupied by the subclavian vessels and the brachial plexus. There is probably no actual pressure of the nerve trunks against the bones, but the whole plexus is confined within too narrow limits. It may be said at once that all treatment will fail, unless the trapezius and serratus magnus are educated to keep the outer end of the clavicle elevated and the shoulder girdle drawn bodily forwards. Unfortunately long rest in bed has usually been prescribed, and thus the muscles have

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been allowed to weaken, while nothing has been done to relieve the pressure. Muscular re-education will in such cases usually be attempted too late to do more than alleviate, but it is still possible to confer great benefit. Thus it is always well to consider this possible origin of the trouble, whenever called upon to treat an intractable case of brachial neuritis.

Little or nothing can be done by massage to relieve neuritis due to organic disease, such as malignant tumours, aneurism, or caries. When paralysis follows pressure on the cord due to caries, massage can aid the nutrition of the paralysed limbs and prevent contractures. The whirlpool bath is always worthy of a trial ; at least it can do no harm, (whereas massage might), and it may procure temporary alleviation. Surface stroking is occasionally of service and may be given a trial. It is unwise to persevere with any form of treatment by physical methods, unless benefit is definite and immediate. Relief, however trifling, should encourage perseverance ; failure to secure it indicates that treatment tends to aggravate the evil. One form of pressure neuritis can be greatly alleviated by massage, that is, when pain in the leg, or spasm of the calf muscles, is due to intra-abdominal pressure during the later stages of pregnancy. Firm stroking and gentle kneading can often secure complete relief.

Neuritis caused by the involvement of a nerve in scar tissue is invariably troublesome. The only hope of cure is to shake the nerve free. Vibration is the chief remedial agent at our disposal. In its application the utmost tact must be displayed. Take, for instance, the neuritis that follows amputation of the fingers. A most disabling condition arises from the pain experienced at the site of the scar, when one of the digital nerves happens to have been caught in the stitches and has thus become firmly imbedded in the scar. Baths and stroking may relieve the pain for the moment ; they will not cure. Ionisation may do the same, but the great hope of permanent relief lies in vibration. Local treatment will aggravate the

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pain, and it is essential to avoid the stumps altogether during the early stages. The vibrator should be applied to the hand near the wrist, if, indeed, this can be borne in comfort ; if not, treatment must begin on the forearm. The fingers are gradually approached until the patient complains of discomfort. Then a slight withdrawal must be made. The whole palm and back of the hand must gradually be included, and finally the adjacent fingers, before the injured digit itself is treated. As soon as the vibrator can be tolerated close to the site of the scar, the flesh of the finger can be submitted to a rolling movement,



FIG. 126.—To show the grip for rolling the flesh of a digit to loosen the tissues when a nerve has been caught in the scar.

which is best imparted by using the two forefingers (see Fig. 126).

Massage treatment for *metatarsalgia* (Morton's disease) is useless by itself ; as an adjunct to remedial exercise it is invaluable. The pain is due to a pressure neuritis, the digital nerves being pressed upon by the heads of the metatarsal bones, the fourth being the chief offender. A tight boot may compress the nerves between the heads of the fourth and fifth metatarsals. The pressure is made possible by the dropping of the anterior metatarsal arch. While there is no weight upon the foot there is no pain, so treatment must aim at correcting the deformity. Sometimes great relief can be secured by strapping the

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arch with adhesive plaster ; this alleviates but does not cure. A broad shoe with low heels must be worn.

Massage paves the way for exercises. The patient is probably flat-footed, and massage of the leg should begin the *séance*, so as to assist the nutrition of the long muscles that pass from the leg to the sole of the foot, and to relieve spasm of the peronei, if present. General kneading of



FIG. 127.—To show position for administering resistive exercises in metatarsalgia. The patient plantar-flexes the ankle and “claws” with the toes.



FIG. 128.—Showing an alternative exercise for metatarsalgia. The patient dorsi-flexes the ankle and “claws” with the toes.

the muscles in the sole of the foot should alternate with the exercises.

The ball of the thumb is then placed on the sole of the foot in such a position that it fits exactly into the concavity formed by the heads of the metatarsals. If the hand is too far forwards it will augment rather than diminish the pain. The patient then plantar-flexes his ankle. In this way the arch is restored by pressure, and the muscles are trained to maintain it (see Figs. 127 and 128). This exercise may alternate with a second, namely, to mould the arch with the hand placed over

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the dorsum of the foot, while the latter is fully extended. The patient then dorsi-flexes the ankle.

The ordinary re-education exercises should be performed religiously (see Chapter XVIII.). The most important is the "clawing" exercise.

Occasionally neuritis may affect other portions of the foot. Sometimes the whole sole of the foot may become intensely sensitive after any prolonged illness; in other cases the heel only may suffer (pododynia). These complaints are probably a true neuritis. In treatment the whirlpool bath should invariably be given a trial as a preliminary to massage, and the latter should take the form of surface stroking, the sensitive areas being gradually approached *viâ* leg and dorsum of foot. As tolerance is acquired, deep stroking, vibration, and kneading follow in this sequence, and treatment should progress till all forms of percussion massage can be given freely.

Non-traumatic neuritis of sensory nerves is due to toxicity or joint disease. The latter type will be referred to later when considering the treatment of osteo-arthritis. Sciatica may be taken as typical of the former.

More dispute, as to the efficacy of massage, has probably raged around its use in cases of *sciatica*, than as to its application in any other form of illness. Physicians as a rule are very chary in prescribing it at all, and very few indeed will do so during the earlier stages. The truth is that, in the early stages, neuritis affords excellent opportunity for the abuse of massage treatment, and, later on, transitory increase in the symptoms may be inseparable from recovery. This may appear to be an injudicious statement, but few physicians would expect complete and instant cure of pain to follow exploration of the nerve and violent stretching, or even simple stretching, under an anæsthetic. Massage or manipulation likewise cannot afford immediate relief, as if adhesions have formed they must be broken or stretched, and this cannot be done altogether painlessly. The whole art is to accomplish the feat with

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the minimum of discomfort. This can only be done by starting treatment with the utmost care and gentleness, gradually increasing its severity as the patient's condition indicates the possibility.



FIG. 129.—To show position for treatment of a case of sciatica, the "cure" being well advanced.

In cases of long standing nothing can compare with massage as a remedial agent. After operation, or sudden stretching, adhesions will almost inevitably re-form, whereas slow, gradual stretching by manipulation should inflict no damage which entails repair in the shape of re-formation. On the other hand, if any attempt is made

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to hasten recovery unduly, actual rupture of the adhesions may take place, and, in that case, the continued vigorous manipulation of the structures, which have been subjected to this recent injury, may well aggravate the condition.



FIG. 130.—The end of the movement shown in Fig. 129.

Attention to the law of treatment, that all points which are hypersensitive are the last that should receive attention, will avert catastrophe.

Treatment, therefore, should begin on the front of the thigh. The quadriceps should be kneaded gently, and should then receive a thorough shaking as soon as

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the condition permits. Treatment of the calf on similar lines follows. Then, and not till then, may "local" treatment of the nerve begin. The preliminary stages may be passed through during the first twenty minutes of treatment, or may require as many days. The same routine should be followed on the back of the thigh while the foot is well elevated on a pillow. As the condition improves the elevation is decreased day by day till the limb rests in the horizontal plane. The patient now lies close to the edge of the bed, and the foot is slowly lowered over the side, while the kneading and shaking continue. As soon as an angle of some 45 degrees with the horizontal has been reached, treatment is more simply conducted with the patient supine. The knee is flexed and raised till the thigh is perpendicular, and thereafter full flexion of the thigh on the trunk can be effected, the continuance of the kneading and shaking assisting the process. The



FIG. 131.—To show how the foot naturally passes into plantar flexion when the hip-joint is flexed, the knee being fully extended. Dorsi-flexion of the ankle adds materially to the stretching of all structures on the back of the limb.

knee is then straightened by slow stages, and finally the foot is dorsi-flexed (see Figs. 129, 130, 131). By following some such scheme as the above, a case of many months' standing may yield to treatment in a few weeks or even days. To hurry is to court disaster.

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When it is evident that any adhesions which may have been present are yielding to treatment, search should be made throughout the whole course of the nerve for any tender points or for "nodal" formations. These may be subjected to frictions, but treatment must start very gently, and the increase of pressure must be graduated with the utmost nicety. It should always be remembered in this connection that symptoms of sub-acute sciatica may be due to a fibrositis of the gluteus maximus and medius. Tender points over these muscles should therefore be sought out and treated.

All other forms of neuritis of long standing should be treated on similar lines, as, for example, occipital and supra-orbital neuritis. Here vibration may replace shaking.

The cause of the pain of *coccydynia* is unknown. It may be due to a pressure neuritis affecting the small nerve filaments that lie in the periosteum. A chronic periostitis may cause the neuritis. Or again it may be due to adhesions in or around the joints. Whatever may be the cause, gradual approach with the vibrator will often cure, even when all other remedies have been tried and found wanting.

In the acute stage of sciatica and of other forms of neuritis the advisability of using massage is a moot point. The trouble is inflammatory, and in all acute inflammation massage is contra-indicated. But the cause of the inflammation is rarely due to any micro-organism, and so the danger of inflicting injury on the patient by massage is more imaginary than real. In fact, it may be possible at times to abort an attack, if treatment is administered within a few hours of its onset. Surface stroking of the anterior aspect of the whole limb should be succeeded by deep stroking and by kneading in turn as each becomes tolerable. The patient then assumes the prone position, and the process is repeated on the back of the limb. Relief must be progressive throughout, or treatment must be abandoned.

If the attack has lasted more than twenty-four hours

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before the first dose of massage is given, it will probably be found impossible to administer this full treatment, but all the manipulations which are possible without removing the patient from the supine position can be performed, and thus the circulation of the whole limb can be improved. This will hasten the removal of the cause of the irritation. Later on a more complete treatment can be administered.

Brachial neuritis, for some reason, does not yield successfully to treatment to the same extent as sciatica. Whenever treatment fails to relieve, absolute rest is indicated. But even so massage can help. It has been proved on countless occasions that abdominal massage hastens the elimination of waste products; and, whenever it is possible to procure it for them, no sufferers from neuritis should be deprived of this means of assistance.

CHAPTER XXIII.

THE TREATMENT OF CONSTITUTIONAL DISORDERS.

THE symptoms which massage treatment is called upon to relieve, when dealing with general constitutional disorders, are those arising from toxicity, whether this be due to sepsis, rheumatism, or to the accumulation of waste products within the body.

Lumbago may be taken as typical of all myalgias. Massage treatment can frequently abort an attack, and can usually cure one when fully established. It cannot prevent repetition. Nothing can do this except the removal of the cause, which may entail appendicectomy, extraction of all the teeth, the cure of constipation, or proper regulation of diet. Sometimes the attack is a pure rheumatic symptom.

By some means or another the patient must be rolled on to the face—a very painful proceeding in an acute case, though the return journey may be a very simple matter. The cause of the pain is unknown ; but, judging from the effects of treatment, we can only conclude that some deposit has been formed in the deep structures of the back, and that the nerves which pass through them are thereby involved. It is possible that the muscles collect waste products within themselves, and that the pain originates in pressure on the sensory nerves of the muscles.

Whatever the cause, treatment is simple and effective. Surface stroking is followed in three or four minutes by ever-increasing depth of stroking from the region of the sacrum to the upper dorsal region. The hands should work on either side of the spinous processes. The whole erector spinæ should then be lateralised by stroking with the ball of the thumb along the edge of the processes so

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as to push the muscle mass away from them. Then the movement should be repeated from the outer border of the muscle, the pressure being directed towards the spine. Deep kneading should follow, beginning over the mid-dorsal region and working upwards. The lower dorsal region is next treated, then the upper again, and slowly each successive segment is attacked right down to the sacrum. Before starting to treat a new segment all the area above should be dealt with anew, either by kneading or by deep stroking.

Dry cupping is a very favourite remedy. In China



FIG. 132.—To show “dry cupping” of the back by massage.

this is done by hand as a special movement of massage. The skin and subcutaneous tissues are gripped between the middle phalanges of the first and second fingers and they are then elevated as far as possible (see Fig. 132). It is a useful movement, and may be freely administered as soon as the pain is subsiding.

Throughout treatment care must be taken that no movement is performed that increases the pain. Anything that tends to do so should be postponed, and one of the earlier movements must be persevered with until the deeper movement can be tolerated with impunity. The *séance* should not be too prolonged, about half an

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hour being fully adequate. The deeper movements especially must not be continued for more than a few minutes over any one spot. The aim of treatment is to hasten the onflow of the lymph and of the venous circulation, and to ensure that the arterioles are toned up. Prolonged treatment may defeat the object by producing a paralytic dilatation. The *séance* should terminate with stroking.

In a chronic case of some standing, percussion may be essential to secure relief. Deep vibrations are probably more effective than any other form. Local areas of tenderness or thickening should be treated by frictions.

Other muscles may be affected in the same way, the commonest being the muscles of the neck. The origin of an attack of *stiff-neck* (torticollis) can nearly always be traced either to damp or cold. It may be presumed that the cause is rheumatic. Treatment should follow on the lines suggested above, but the stroking should be performed from above downwards, while kneading should begin near the root of the neck and slowly work upwards.

Pleurodynia, perhaps the most common of the acute forms of myalgia, consists of excruciating pain in the intercostal muscles. Much can be done to relieve it by massage, but we have to rely chiefly on kneading and friction. Stroking should, however, precede and succeed these movements.

Any other muscles may be affected, those of the head and of the shoulder regions furnishing examples. Treatment must be conducted on lines similar to those sketched out above.

In all cases of myalgia we are justified in assuming toxicity. If this is true, the more we can assist the elimination of waste products the better. Local treatment should therefore be followed by a short general massage of the four limbs, and abdominal massage should never be neglected.

A condition closely allied to myalgia is found in the fasciæ—a *fibrositis*. It is often accompanied by obesity. The cause is probably the deposit of toxic material in

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the lymph spaces lining the facial planes. Treatment should be carried out as described for cases of lumbago in its various stages—acute, sub-acute, or chronic.

Nodular points of exquisite tenderness are more common in the chronic stage of this complaint than in the myalgias, and call for treatment by frictions. These should begin very gently, and, as tolerance increases, may become steadily firmer. The presence of nodular thickenings can sometimes be detected more easily if oil is applied to the patient's skin. Its presence is a hindrance rather than an assistance to the performance of the massage.

Obesity can receive great benefit from massage, but great caution should be exercised in applying the treatment. One rare form of obesity is accompanied by pain in the areas where the fat is about to be deposited.

There are four main classes of obesity. It may be hereditary, when the undue deposit has no effect on the general health, and therefore the aid of massage will not be invoked.

In children it is usually due to concurrent disease, such as anæmia and rickets, which must receive appropriate attention.

Women about the time of the change of life frequently “put on flesh” at an alarming pace. As a rule thyroid extract is a more scientifically correct treatment than the application of massage; but, if the latter is prescribed, benefit will accrue, provided that the general health is suffering from the deposit.

The fourth type of case is the one that usually calls for massage treatment. This may be described as the “gouty” type. It may occur in many different ways, but, roughly speaking, cause and effect may be summed up by stating that injudicious or excessive feeding introduces into the body an amount of nourishment in excess of that required for the expenditure of energy. The excess is the cause of the fatty deposit. This condition is usually

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encountered in people over forty years of age, and may be very serious and disabling. Two classes of case are commonly met with—the chronic over-feeder and the man who suddenly alters his habit of life, without altering his dietary to correspond with the decrease in exercise.

The utmost care must be taken to discriminate between two main groups of cases—namely, that in which the vital actions (heart and respiration) are unimpaired, when the patient is frequently said to be suffering from fatty infiltration of the heart, and that in which either or both have suffered, perhaps severely, and the diagnosis is fatty degeneration of the heart. To contrast the treatment, it may be said that exercise for the latter may be fatal; for the former it may suffice to cure.

The toxic (or gouty) form, in which the vital functions have not suffered, may be remedied by massage, and the main objective in treatment should be to assist the vascular system, particular attention being paid to the portal circulation. Gentle, rhythmical kneading, combined with deep stroking, should be applied to the four limbs, and general abdominal massage should follow. Breathing exercises—the simpler the better—complete the *séance*. As “tone” returns a gradually increasing amount of exercise may be prescribed. The importance of breathing exercises will be better realised, when we consider that it is not uncommon to find *post-mortem*, that unduly stout subjects often have a comparatively small lung capacity, while in thin subjects it is comparatively large.

Though massage can render valuable assistance to these sufferers, it can in no way compete with exercise as a remedial agent, since the cause of the condition is chiefly lack of it. But, usually owing to heart involvement, the victim is unable to indulge in the natural cure, and so artificial means are necessary. Much as massage can assist, the benefit is bestowed far more rapidly and efficiently by the use of general rhythmical Faradisation on the Bergonié Chair. By this means every muscle in the body can be exercised freely, not only without strain-

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ing the heart, but while actually saving it from labour. As Sir Lauder Brunton has said, "at each relaxation of a muscle it tends to cause a vacuum within its surrounding fascia, into which the lymph flows from the muscular structures. At each contraction the muscle presses lymph out, and these alternate muscular movements really act as a subsidiary heart." By use of the Chair every muscle in the body is thus transformed into a "subsidiary heart," and that, too, without involving any strain, or even effort, on the part of the nervous system. Sometimes patients actually fall asleep under treatment. Local troubles, such as fibrositis, which may coexist with the obesity, call for additional treatment by massage.

For the non-toxic type of obesity the Bergonié Chair is practically useless, whereas massage can often be of great service. To be effective the treatment must be thorough. An old-fashioned remedy for the undue deposit of fat about the hips of women—almost in itself a separate type of obesity—is to roll on the bare floor night and morning for a few minutes. Several patients have borne witness to the efficacy of the remedy. The problem is to transfer the fat globules to the lymph channels, and to effect this end some form of emulsification has to be performed. In some positions, such as under the chin, rolling between finger and thumb will prove efficacious. On the abdomen, picking up of the whole of the subcutaneous tissues of the abdominal wall will prove satisfactory, while elsewhere a combination of this and of kneading will prove to be the best technique. General abdominal massage should be included, though it is not so essentially a part of treatment as in the toxic variety. All treatment must be vigorous.

A well-known *mot* runs that "no man need have the gout who can afford to keep a slave," and doubtless it is true as regards the acute attacks that follow gross errors of dietary—if the "slave" be an expert masseur. Though regarded with levity by that portion of the public which

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does not suffer from it, this horrible complaint is not only a cause of acute suffering or intense discomfort, but also may lead to permanent crippling and even hasten the approach of death. Let us remember, too, that, though many patients have brought the curse upon themselves, there are many others who suffer as the victims of circumstances. Osler states that hereditary influences can be traced in 50 per cent. to 60 per cent. of all cases. In addition to joint changes, the patient usually suffers from chronic nephritis, arterio-sclerosis is common, and the heart is often hypertrophied. Emphysema is frequent in old-standing cases.

Whether obesity is present or not, treatment should be administered in the same manner as was advocated for that of the toxic variety of the complaint. The nodular points, which called for frictions, are here replaced by the deposits around the joints in chronic cases. In acute cases the whole of the area of inflammation should, of course, be given a wide berth. With this reservation massage is not only permissible, it is appropriate. General massage (especially abdominal) should open the *séance*, the limb containing the inflamed joint being left till the last. Supposing, as is usual, that the great-toe joint is affected, the whole limb should receive a dose of surface stroking from the mid-tibial region to the hip. Deep stroking is gradually substituted, and then the thigh should be kneaded gently. Stroking terminates the *séance*, which should have afforded the greatest possible relief to the sufferer, if technique has been efficient. The attack over, the patient should be given a table of exercises to be used as a prophylactic. The tendency to emphysema renders it necessary that respiratory exercises should take a prominent part, and the cardiac hypertrophy warns us to begin cautiously, increase gradually, and at all times to avoid strain. It is probable that regular doses of massage, or of Bergonié treatment, can serve as a permanent prophylactic against acute attacks, and that either can retard the progress of the disease and of its coincident evils. It is thus possible,

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by ensuring the more efficient elimination of urates, that even life itself may be prolonged for "gouty" patients.

At the present time *osteo-arthritis* is usually an incurable disease. The cause is unknown, but doubtless it owes its origin to chronic poisoning. This may be from some local focus, such as pyorrhœa alveolaris or chronic constipation; or it may be due to the lack of something in the organism which controls the metabolism of the body. On this subject little is known, but thyroid insufficiency appears to be a possible cause of the trouble, since adequate treatment by adding the extract of the gland to the dietary often seems to alleviate, if not to cure, the disease.

It has been said, with some degree of truth, that victims of *osteo-arthritis* rarely suffer from other ills, unless indeed the disease can be traced to some definite cause. Thus it comes about that the disease is chronic in character and usually very prolonged. The pain in the swollen joints is often very acute, and they are therefore held rigidly in the position of maximum comfort. The result, only too often, is the formation of contractures.

When massage is invoked there should be several aims in view. First, the presumption is that some general toxic condition calls for remedy. General massage, particularly to assist the portal circulation, should therefore be given. Second, the possible cause should be sought for diligently, and everything that can possibly be done to assist in remedying any abnormality of function should be carried out. Thus constipation or indigestion should receive appropriate treatment. Third, every effort should be made to prevent the occurrence of contractures, as, once they are present, little can be done to remedy the defect without operation, the result of which is frequently disappointing. Mobilisation in all its forms should therefore be an essential part of treatment. Fourth, mobility should be restored with all possible celerity at all joints, for the very fact that one joint is maintained in a state of rigidity necessarily entails lack of mobility in neighbouring

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joints. If we accept the axiom that "movement is life," the reduction of movement in a normal joint may be presumed to lower its vitality, and thus it would be more liable to fall a victim to the disease. Fifth, much can be done to prevent the stiffening of the affected joints, and this may save the patient the very painful remedy of movement under an anæsthetic. Careful administration of relaxed movement is the best remedy at our disposal. Sixth, the evils consequent on enforced lack of exercise should be guarded against, and every effort should be made to maintain the nutrition of the muscles and to assist elimination of waste products. Seventh, and last, the psychical aspect of the case must never be disregarded, as the victims of this painful, crippling, and incurable disease need all the moral and psychical support that can be lavished upon them.

As with most other ailments, the disease may be acute, sub-acute, or chronic. Also it may be mono-articular or general. The former can frequently be traced to some definite injury. Often enough, particularly in women after the menopause, both knees become affected as the first evidence of the onset of the polyarticular variety. The progress of the disease to the other large joints may be very slow. In another type of case the small joints of hands and feet are affected while the large joints apparently escape. Finally, there are cases in which the onset is acute and general, and the attack is often confused with rheumatic fever. The most terrible form of the disease is that which affects the joints of the spine (spondylitis deformans).

The true mono-articular variety is very easily dealt with. Massage of the whole limb should be given to assist the general circulation and local treatment to assist the nutrition of the wasted muscles. All the muscles which control the movement of the joint should receive attention, even though all are not wasted alike. Relaxed movement should be administered during the continuance of the massage, and, if the trouble is chronic, assistive movements should be given, and active movements

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prescribed as regular courses. Both should be begun tentatively, and progress should be graduated with care. Faradism will prove invaluable in restoring the strength of the wasted muscles. Bier's congestion treatment, the *cau courante*, and radiant heat baths all form valuable adjuvants.

Treatment of a similar character may be given to the polyarticular variety of the disease during its chronic stages. If the patient's activities are reduced, the treatment in all its forms should be general, special attention being paid to the abdomen. No matter how advanced the disease may be when we are asked to help—the patient may have only a bed-ridden caricature of a human body—still the treatment must be carried out in the same way with all patience and never-ceasing care. However hopeless to all appearance, no deformity can be so extreme but that it will become worse if left to run its course, while material improvement can usually be bestowed. The lightest stroking may be unbearable over certain points at first, and movement may be impossible. Treatment should be guided by the law so often quoted—any point that is tender or hypersensitive is the last that should receive attention. Similarly, any joint that is sensitive should have its dose of mobilisation postponed until the other joints have had their exercise. By their recovery of mobility it may be possible to restore some degree of vitality even to the most hopeless joint, though restoration of mobility will be regulated by the amount of bony deformity and of muscular contracture.

It is almost impossible that manipulations should be painless, but the pain should be limited to what many patients refer to as a "pleasant ache" or a "nice pain." Should severe pain be caused inadvertently, it can usually be relieved by stroking.

Great care should be taken to regard in treatment the law that deals with the signs of excess. Any decrease in movement, or increase of pain or swelling, as compared with the condition present on the previous day should indicate that treatment must be reduced. The treatment

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may not have been excessive the day before, as the disease is liable to wave-like variations ; but treatment that may be beneficial one day might well prove harmful the next, if some slight exacerbation has taken place during the night.

During the acute phases the utmost care must be exercised ; massage should be of the lightest and should aim solely at relieving pain, while mobilisation should be left for a future date. As the attack subsides much benefit can be derived from cautious local kneading of the periarticular structures.

Few physicians seem to realise the fact that massage treatment is capable of rendering invaluable assistance to *diabetic* patients. Most will recognise that treatment at Aix-les-Bains is powerful for good ; but after all, when there, the chief remedial agent is massage. The local water is utilised as a lubricant, it is true, but, as Graham writes, “ this is simply another illustration that every substance capable of being rubbed on the human body has had wonderful virtues ascribed to it, and it must be that which is common to them all that does the good—namely, the rubbing.” This has been echoed, when writing on another subject, by Sir William Bennett, who says : “ You may use liniments or not as you like : it is the rubbing that does the good.”

It has been proved over and over again that massage has a potent effect on the elimination of waste products. General massage should therefore be administered to the diabetic, particular attention being given to the abdomen, with the idea of assisting the portal circulation.

Diabetic neuritis may be greatly benefited by massage, the pain or numbness relieved, and the irritation or tingling kept in abeyance. If all that massage could effect was alleviation of the torture of the irritation, its administration would be invaluable.

It may be too much to say that massage can permanently prevent the onset of diabetic gangrene ; certainly

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it can postpone it for a very long period of time. Moreover, it can prevent or limit its spread when once established, and can hasten the healing of ulcers on the feet which, without its aid, would never heal. Prevention being better than cure, massage should always be given to assist the circulation in the lower limbs whenever its aid is invoked in the treatment of diabetes. The fact that gangrene is liable to occur should suffice to indicate the care and caution that should be exercised. Deep stroking must be performed with delicacy of touch, and kneading or picking-up should be of the gentlest possible character. Senile gangrene, probably a symptom of arterio-sclerosis, may be dealt with in a similar manner. As a prophylactic the use of massage has proved to be most encouraging.

In the treatment of *rickets* we have to deal with another general disorder of metabolism. It is a disease of the first and second years of life, though occasionally so-called "adult rickets" may develop at about the time of puberty.

The disease is due to faulty nutrition, and may have lasting effects. The child may be lean and "scraggy," or fat and flabby. There is fretfulness, slight fever, and sweating at night. The mother often reports that "baby is tender all over."

The lightest possible stroking over the whole body with warm oil will do much to relieve the sensitiveness, especially if the child is of the "scraggy" type. The liver is usually enlarged and the abdomen distended by this and by flatulence. The child is therefore "pot-bellied," and abdominal massage, very delicately performed, should be practised. The legs tend to bow, and so soft is the bone that much may be done to mould them into shape by massage. No attempt should be made to hurry the process. The general tenderness that exists will probably ensure that progress is slow, but in any event the moulding should be performed with all possible gentleness.

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A long period of time often elapses before the bones become rigid, and so it is possible to do much for the correction of other deformities which are frequently noticed in chest and back. The child will usually be found to have adenoids, and the tonsils will probably be enlarged. As soon as the patient is old enough breathing exercises should be taught. As a rule these should consist of lateral body-bending exercises with rotation, so arranged as to render the compressed lower ribs prominent. Deep breathing is then encouraged, and the child is taught to dilate that part of the base of the lung that has hitherto been prevented from expanding. Assistance should be given in the form of attempting to twist the ribs round while the spine remains fixed. Abbot has shown the extraordinary power of the repetition of the respiratory movements in moulding the chest wall, when the movements are properly directed. Stated shortly, the principle underlying his treatment for scoliosis is to place the patient in a plaster jacket, which is so arranged that the prominent part of the chest wall cannot expand while the receding portion, being out of contact with the plaster case, can do so. The incessant movement of these ribs, and the comparative immobility of those of the opposite side, not only results in alteration of the shape of the ribs, but also corrects the rotation of the vertebræ. But, if the bones are soft from rickets, this plan is dangerous, as it is likely to result in all sorts of moulding in undesirable and unexpected places. It is for these cases that massage, hand moulding, and breathing exercises should be employed. Though plaster cannot be applied, at least the principles underlying the treatment should be employed. Later on, when the bones are firm, these means are of small avail, and, if deformity is to be remedied, plaster should be used. The greatest possible care is necessary in its application.

When applying massage to cases of rickets the treatment should be general. Even if there is no apparent deformity of the limbs, these call for treatment so as to ensure their fullest possible nutrition, and to assist in

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elimination of waste products. Abdominal massage is called for to relieve any tendency to constipation that may exist, and to assist the portal circulation.

The *primary anæmias* are not calculated to derive any great benefit from massage treatment, beyond the fact that it is always possible to add greatly to the patient's sense of well-being by its employment.

In dealing with *secondary anæmias*, however, much benefit may be derived from skilful massage. Graham has epitomised some elaborate investigations by J. K. Mitchell as to the effect of massage on the blood. After treatment there is usually a great increase in the number of red corpuscles, and frequently in hæmoglobin. Moreover, the effect is not transient, as, when the improvement had been noted throughout a course of massage, its cessation did not lead to any return of anæmia. He adds that massage does not create blood-cells, and indicates the manner in which benefit may accrue by quoting from Mitchell, who likened anæmia to "the want of circulating money in times of panic, when gold is hoarded and not made use of, and interference with commerce and manufacturing results."

In all cases of illness it is a little difficult to decide the relationship of cause and effect. In chlorosis there is almost invariably associated a marked degree of constipation. The latter may be the cause of the anæmia ; and certainly it is wise, from the massage point of view, to consider all anæmia cases, that we are called upon to treat, as being toxic in origin. Abdominal massage, to aid the portal circulation and to combat the constipation, should therefore be awarded a prominent place in treatment. Breathing exercises should always be prescribed.

Some physicians request the masseur to try to reduce œdema of the legs in patients suffering from *chronic nephritis*. It is a hard and often a heart-breaking

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task, were it not that the patient derives great comfort from proper manipulation. Nothing need be added as regards the local treatment to what has already been said on the treatment of œdema (see p. 18). But local treatment is applied for the symptom and will not assist recovery in any way. Yet massage may even do this, as part of the main trouble is probably toxic. It is well known that general, and particularly abdominal, massage can greatly increase the output of urine, and can also add materially to the percentage of solids excreted in it. The patient with œdematous feet is deprived of exercise, and so the accumulation of waste products proceeds apace. This added toxicity of the blood can only act detrimentally upon the already diseased kidneys. Thus permission to perform abdominal massage should always be sought when called upon to treat a chronic nephritic ; but, if it is granted, one danger must be borne in mind. Nearly all these cases have a high blood-pressure, and every care must be taken to avoid causing an excessive or a sudden rise. Otherwise the patient may run the risk of cerebral hæmorrhage.

Abdominal treatment must therefore be of short duration and gentle in character, and should aim chiefly at assisting the portal circulation. There is rarely any need to give treatment for constipation, as this is invariably attended to with care by the medical man as a routine part of treatment.

Though not strictly speaking a general constitutional disease, this is probably the most suitable place to refer to the treatment of *Grave's disease* (exophthalmic goitre). From the purely massage point of view we should consider the patient as a victim of neurasthenia combined with a general toxæmia. It is wise to treat all these patients on the lines advocated for the treatment of neurasthenia, with this difference, that general abdominal massage, designed particularly to assist the portal circulation, should always find a prominent place. Treatment

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should therefore begin with surface stroking of the legs, general abdominal massage follows, and finally the back, arms, and head regions receive their dose of sedative treatment in the order named. There may be a temptation to administer local heart treatment. It is probably unwise from the psychological point of view. The patient suffers from tachycardia, and often imagines that the heart is seriously diseased. The physician may have to devote much time to dispelling this dread, and to administer local treatment may well lead to the supposition that his assurances are mere soporifics.

One word of warning is required about massage of the neck in this condition. It must be conscientiously avoided. No pressure whatever must be placed on the gland, as this leads to increased absorption. This is recognised in the operating theatre, where it is well known that the danger to the patient is almost directly proportionate to the extent of manipulation of the gland. It was probably due to lack of realisation of this fact that so many patients lost their lives in the earlier days of operation for this complaint.

CHAPTER XXIV.

MASSAGE TREATMENT FOR DISORDERS OF THE DIGESTIVE SYSTEM.

MANY patients are told to massage their gums ; few are instructed how to do it. The suggestion is usually made when pyorrhœa alveolaris is either present or suspected. There is a dual objective, namely, to empty any pockets of pus that may be present, and so to assist the vascular supply of the gums that infection may be overcome or prevented.

To empty any pockets that may be present, kneading should be employed from the labial attachment towards the edge of the gum. The side of the finger is applied firmly and the pad is then rolled over the gum in the direction indicated. When pus is present the gum will bleed slightly, so we are justified in the assumption that our manipulation will cause a certain amount of absorption. Thus, no doubt, each pressure entails the administration of a mild dose of toxin. The kneading (which practically amounts to squeezing) should not, therefore, be very vigorous, at least in the earlier stages. It is well to wrap the finger round in a piece of lint dipped in strong peroxide of hydrogen (20 vols. per cent.). It can subsequently be burnt. Care should be exercised in using the lotion, as it tends to destroy anything it touches. The gums should then receive treatment by firm stroking from the mid-line in front to the extreme end behind. The whole *séance* should last about ten minutes. Indiscriminate scrubbing is of comparatively little use.

Pharyngitis can frequently be relieved by massage. The relief that can be secured when suffering from a

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“sore-throat” is considerable. The difficulty in swallowing is diminished, the general feeling of fulness and dryness is improved, and the “heavy feeling” in the head is relieved. It is probable that the whole attack can be considerably shortened, while many chronic cases clear up quickly. Plain downward stroking is all that is required (see Figs. 113, 114, and 115). It should begin on the surface only, the pressure gradually increasing as the *séance* proceeds. After some ten minutes the palm of the hand may be placed over the area where the lymphatic glands are involved, and a very gentle circular kneading movement is administered for two or three minutes. The stroking is then resumed and gradually fades away into the surface variety again. Swallowing can be rendered less painful by taking a mouthful of water, then pressing the antitragus firmly into the external auditory meatus, so that the latter is completely closed. The water is then swallowed in small quantities, when it will be found that, on relief of the pressure on the ears, swallowing will be a comparatively simple matter.

In the treatment of tonsilitis the same plan should be followed, but the local treatment over the glands should be omitted if they are swollen or tender. The relief afforded may be very great, and it is probable that the duration of the attack can be curtailed.

Spasm of the œsophagus is usually a functional ailment. It can be most distressing to the individual. It may be one symptom among many, or it may be the solitary manifestation of nerve irritability. In the former instance treatment should proceed on the general lines mapped out for the treatment of neurasthenia. When the symptom is an isolated manifestation it is usually possible to connect the spasm directly with some simultaneous mental excitement. In other words, the cause is hysteria rather than neurasthenia. One patient for many years rarely ventured upon solid food unless someone “in the know” was at hand ready to administer a very violent form of percussion to the dorsal spine. This invariably gave relief

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and suggested the correct line of treatment for similar cases, viz., systematic percussion daily throughout the dorsal region.

Certain diseases of the *stomach* are amenable to massage treatment, others are not. In the latter event it may even be dangerous to perform abdominal massage at all. Thus, ignoring for the moment the ethical side of the question, the masseur who undertakes abdominal treatment without the recommendation of a medical man is guilty of a foolhardy act, which, should evil follow, could only be held to be severely reprehensible. Nothing could militate more against the chances of the patient's recovery than massage treatment for dyspepsia where the cause is the onset of malignant disease. Again, when we study *post mortem* a circular gastric ulcer with its base resting on the peritoneum—which alone separates the stomach contents from the general peritoneal cavity—it is possible to realise how highly dangerous massage treatment might be.

Considering the ethical side of the question, no advice whatever should be given by the masseur as to food or drink without consulting the physician—even the most homely remedies must not be recommended; while to suggest the use of magnesia, soda, lemon, charcoal, or other remedies, should be possible only to those who care not whether they disgrace or honour their profession, and who are willing to drag their fellow-workers into the general condemnation that such breaches of etiquette deserve.¹

¹ To most of my readers I hope that these remarks will appear to be unnecessary. Unfortunately this is not invariably so. Only a few days ago a medical man was expressing to me his distrust of massage workers in general. On inquiry it transpired that his masseur had been prescribing a patent charcoal biscuit for his patient, and he had taken this exceptional behaviour as typical of what he might expect from masseurs as a whole. Again, only to-day I saw a lady suffering from sub-acute obstruction due to intra-abdominal adhesions. A fully-qualified Swedish masseuse had been giving abdominal massage for ten days. The patient's condition was steadily deteriorating, and my

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Atonic dyspepsia is the form of gastric trouble for the relief of which the aid of massage is usually invoked. The causes of this complaint are numerous, and treatment must be modified to suit the requirements of each individual case. Thus it may be a symptom of neurasthenia, when local treatment is useless without due attention being paid to the general condition, as indicated in a previous chapter. It may be part of a general debility, as for instance after a severe attack of influenza or of typhoid fever. Here, too, general treatment is probably of greater value than local, as restoration from stomach trouble is dependent on that of the whole organism. In chlorosis the benefit of massage will probably be very partial until the toxæmia due to the chronic constipation has been overcome.

The atony may be the primary cause of other troubles, and then local treatment by massage holds out the best chance of recovery that the patient possesses. Thus chronic dyspepsia, from whatever cause, may lead to the atonic type. The chronic dyspeptic who over-eats, or drinks much beer or other fluid, affords the typical picture. In this country, where so many of us (and women in particular) drink too little to maintain the physiological balance within the body, the over-eating is probably the chief cause. The same applies to the French; while in America iced drinks and "cocktails," and in Germany beer-drinking, are probably the usual causes. Last, the atony may be due to structural defect due to chronic over-stretching. This is not infrequently a symptom of visceroptosis, and always follows pyloric obstruction.

Be the cause what it may, the symptoms do not vary

advice was asked. The technique was good (though somewhat too vigorous). Something else was obviously at the root of the trouble. Investigation proved that the masseuse had advised a strong purgative pill, and one had been taken each night since treatment commenced. I had never heard of this masseuse before, but could not help thinking that it would have been impossible to imagine a more humiliating situation than mine would have been had I been responsible for the recommendation of a masseuse who could be guilty of such conduct.

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very greatly. There is always a feeling of oppression in the stomach, which may or may not amount to actual pain at intervals, usually after food. The patient may have a furred tongue and little appetite, but the "oppressed" feeling is often mistaken for actual hunger, and appetite may be voracious and thirst great. Acid eructations are common and flatulence is almost invariable.

Emptying the stomach regularly of its contents constitutes the cure, unless mechanical impediment is present. This alone can allay the inflammation of the mucous membrane, and thus enable the stomach to regain its powers of excretion. Moreover, when empty, the over-stretched muscle fibres are left at liberty to contract down to normal length, and thus regain their tone.

Any form of dyspepsia may be a forerunner of the atonic variety. To prevent this sequence of events every effort should be made to empty the stomach. Thus, for the treatment of dyspepsia, whatever the cause, local treatment is always the same. As usual, massage may be employed for either reflex or mechanical result.

The stomach reflex area lies from the tip of the tenth costal cartilage on the left side to the sternum and then down the right costal margin. The technique is thus described by Dr. Douglas Graham, of Boston, Mass., in his text-book: "With the patient supine, place the phonendoscope or stethoscope on the right of the umbilicus. Place your right hand on the patient's abdomen with the tips of the fingers at the costal margins; then find the tip of the tenth rib, and with the tips of the first, second, and third fingers glide very gently with a trembling motion over the skin. It is the delicate, light touch which is efficient. After a few seconds or minutes, action will be heard beginning in the stomach. The first to leave is always the gas. Cease the stimulation until the contraction has stopped. Then begin again and continue till the stomach is empty, when a blowing, sighing sound will be heard. These treatments should

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be given daily, five hours after a meal, and last from twenty to thirty minutes, and should be continued for a while after recovery to prevent relapse. Constipation usually accompanies this condition, and at the end of the first week the bowels move normally in most cases. It is necessary to continue the daily treatments until at 6 p.m., after an ordinary meal, there is no sign of splashing, distension or retention of food."

Nothing more need be added as to treatment, which aims solely at securing contraction by reflex. When there is no great dilatation, this means will prove all-sufficient, but if the greater curvature can be shown by percussion—it may even be freely visible—more than two fingers' breadth below the costal margin, other means should be used as adjuvants. We rely now on two things: first, the reflex contraction of unstriated muscle in response to mechanical stimulation, and, second, the mechanical assistance we can give, to ensure that the fluid contents of the stomach pass outwards when the pylorus relaxes.

If we notice the rate of passage of a peristaltic wave across the abdomen, it is seen to be very slow. A wave is started in response to mechanical stimulus at the left side and passes slowly across, relaxation following contraction. If a second stimulus is administered before the relaxation is complete, there is great danger of producing spasm, and all wave-line motion ceases. Add to this undesirable result the fact that undue stimulation is liable to paralyse the unstriated muscle fibres, and we see at once that there are two essential laws of treatment—the movements must be slow and gentle. The rate should be about twelve movements a minute and the pressure only sufficient to dent the abdominal wall. Any pressure submitted to the surface will be transmitted through the hollow viscera, almost as if the whole contents of the abdomen were a fluid mass and subject to the laws of hydrostatics—provided, of course, that the abdominal wall is sufficiently relaxed to allow of the transmission of pressure at all. The truth of this is seen whenever an abdomen is opened in the Trendelenberg

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position, when all the hollow viscera are found to have gravitated into the upper part of the abdomen, save only those portions that are bound down by the peritoneum to the posterior abdominal wall.

Throughout treatment, whether aiming for reflex or mechanical effect, the patient should be in a position to allow the fluid contents of the stomach to impinge upon the pylorus whenever this happens to relax. There is a double objective—first, to cause contraction and thereby to exercise the muscle fibres (thus increasing their tone), and, second, to enable them to rest to the uttermost after their contraction, which can only be accomplished if the stomach is empty. The fullest contraction of the elongated fibres cannot empty the stomach unless everything is done, by arranging the postural position, to ensure that the fluid escapes into the duodenum whenever opportunity affords. Thus a pillow should be placed under the left side of chest and abdomen, the whole trunk should be flexed as far as is comfortable, the thighs flexed, and the knees flexed and supported on a pillow (see Fig. 112). When aiming for mechanical effect, the little finger of the stroking right hand should follow the outline of the greater curvature, and there should be a distinct attempt, as it were, to push the stomach upwards against the diaphragm.

As already stated, constipation is frequently present, and no *séance* can be regarded as complete that fails to deal with this complication. Absorption is faulty, and therefore everything should be done to assist the portal circulation, and, as it is more than probable that a general toxæmia is present in greater or less degree, a short time should be spent in general massage of the whole body.

As usual, full benefit cannot be bestowed by any external agency, and the patient should be instructed to use nature's own method of administering massage to the stomach, by practising deep breathing exercises, and a series of exercises should be designed of gradually-increasing severity for the abdominal muscles.

Surface stroking with surface vibration and deep

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stroking, with a vibratory movement incorporated in the stroke, are the only forms of massage that are permissible.

There are many neuroses of the stomach classified by Osler, thus :—

Motor Neuroses.

Supermobility.
Peristaltic unrest.
Nervous eructations.
Nervous vomiting.
Rumination.
Spasm of the cardia.
Pyloric spasm.
Atony of the stomach.
Insufficiency of pylorus.

Secretory Neuroses.

Hyperacidity.
Supersecretion.
Nervous sub-acidity.

Sensory Neuroses.

Hyperæsthesia.
Gastralgia.
Anomalies of the sense of
hunger and repletion.
Absence of sense of satiety.
Anorexia nervosa.

Most of the motor neuroses not already mentioned can be benefited by massage, by restoration either of tone or of rhythm. They are chiefly nothing more than symptoms either of psychasthenia, hysteria, or neurasthenia, and tend to disappear or to remain according to the progress of the general disease.

Hyperacidity and supersecretion can both be remedied to a certain extent by massage. In the former a long drink when digestion is at its height,—say two or three hours after a meal, according to the food taken,—followed by massage, tends to rid the stomach of all irritating material, and may avert the sequel of chronic dyspepsia. In supersecretion it should be possible so to hasten the onflow of the gastric contents by massage, as to minimise the risk of dilatation. Restoration of general strength and stability is the only method of cure. In sub-acidity cases the latter is the only course open to us, as the mobility of the stomach remains unchanged, and no irritating material is present which requires removal.

The sensory neuroses are all symptomatic of irritability of the central nervous system, and therefore call for treatment as outlined for neurasthenia. Local stomach treat-

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ment will probably be found useful from the psychological aspect.

It is usual to administer massage to the coils of small intestine, whenever general abdominal treatment is undertaken. The *raison d'être* of the practice is not clear. In the first place, during X-ray examination for obstruction, etc., it is the rarest thing possible, unless mechanical obstruction is present, for delay in the small bowel to be detected after the bismuth meal. Only if the cæcum is at fault or if a "kink" is present is delay noticed in the last few inches of the ileum, unless again there is organic obstruction. The aid of massage should then be invoked only in exceptional cases, and probably with a view to stretching adhesions under an old scar. Next, unless visible peristalsis is present, it is impossible to judge in what direction the contents of the bowel under the hand are moving. Thus it may easily happen that we try to excite the peristaltic wave in a direction opposed to that which is intended, or attempt to force the contents of the bowel "against the stream."

Poisonous products do not tend to collect in the small intestine as sometimes in stomach or colon ; when present, they lead to diarrhœa. For this condition massage may be of service, though it may seem bold to claim that one agent should be invoked to assist the cure of both constipation and diarrhœa. Yet so it is with calomel in therapeutics.

Most of us know the sense of comfort produced by a hot bottle or a vigorous rub over the abdomen when suffering from the "colicky" pains, which accompany diarrhœa when the small intestines are affected. Moreover, a long railway journey is frequently beneficial in chronic diarrhœa. There must be some pathological explanation, and the most likely is that the heat relaxes spasm reflexly, while the rubbing and the railway journey act much as vibration in neuralgia, namely, by breaking the rhythm of the peristalsis, so causing relief of the

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spasm through the starting of another wave in a portion of bowel already relaxed. But the small intestine can, as a rule, be trusted to take care of itself, and certainly massage in diarrhoea should be administered with caution. The fear would be that absorption through the inflamed mucous membrane would be rendered more easy by manipulation, whereas there can be no call to increase the activity of the bowel, which is already doing all it can to hasten the passage of its contents. As delay in other conditions is quite exceptional, massage can only be required to stimulate peristalsis in exceptional cases.

It must be remembered, however, that the veins of the abdominal viscera have no valves, and that the venous flow is therefore dependent on external forces. Hence the necessity for massage over the central portion of the abdomen, whenever we wish to assist the portal circulation. But massage performed with this objective differs materially in technique from that which aims at assisting peristalsis. In either case the patient should be recumbent with the knees and thighs flexed by placing a pillow beneath the former. When dealing with the portal circulation only, the head and shoulders should be kept as low as possible, while when administering treatment to the bowel itself the shoulders and head may be raised. Again, when assisting the portal circulation there is no call for the use of vibration in any shape or form; deep stroking and kneading constitute all that is permissible. The pressure should be exerted from below upwards and towards the middle line, should be quite gentle—though, when the abdominal wall is properly relaxed, the hand may sink in deeply—and adequate time should always be allowed to elapse for the veins to refill before pressure on any spot is renewed. It is important, moreover, owing to the absence of valves in the veins, not to render the pressure intermittent as the hand passes upwards. In stroking the pressure is always even, but it is necessary slightly to alter the technique of kneading. The hand is placed flat on the abdomen and the maximum amount of pressure is exerted

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at once. A rotatory movement is then imparted while the hand glides slowly over the surface. It is possible to compare the effect of the movements on the blood in the veins with two forms of waves. When stroking we can imagine the onflow of the blood to resemble the Atlantic roller sweeping on; while, when kneading, the wave would resemble the ripples on the surface of a swift-running river. It is often wise to work with both hands in unison, so as to act as uniformly as possible on the whole venous system of the abdomen at the same time.

Intussusception is one of the common causes of acute intestinal obstruction. As a rule the ileo-cæcal valve invaginates, as it were, the wall of cæcum and colon; the latter then embraces it and attempts to pass it on as if it were a foreign body. The result is somewhat similar to that reported when two snakes tried to eat the same rabbit. The stronger represents the colon and the weaker the ileum, while the rabbit corresponds to the ileo-cæcal valve. After arriving at the point of junction the stronger proceeds to swallow successive portions of the weaker. Nothing should be more simple in the early stages than, by the use of massage, to evaginate the small intestine from the large. Graham reports many cases where this treatment has succeeded. There is no need to emphasise the fact that only in recent cases should massage be applied, for, if a few hours have elapsed, the bowel wall may have suffered to such an extent that it would perforate later, even if left to itself, and massage in this case must be exceedingly dangerous. None the less, it should be quite possible to relieve a very recent case by massage, and the technique should consist of applying massage in an upward direction to the ascending colon on the rectal side of the tumour, much in the same manner as friction is applied to the iliac colon. The enlarged mass should not be handled directly at all. The stroking begins close to it on the distal side

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and passes along the adjacent bowel. At the same time stroking in the opposite direction should be performed over the bowel on the proximal side. The chief difficulty would be to secure adequate relaxation of the abdominal wall. The delay of operation could not exceed fifteen to twenty minutes, as, unless success has been attained by that time, no amount of perseverance would be calculated to succeed.

Graham also reports several cases of acute intestinal obstruction that have been completely and rapidly relieved by massage. These must be chiefly cases of obstruction by bands. Without experience it is impossible to say what percentage of cases could be treated with success. It is certain that no attempt should be made if more than twelve hours have elapsed since the onset of the attack. Twenty years ago it would have been desirable to extend to massage a free trial in cases of this nature, but the improvement of surgical technique has rendered the danger of operation so slight, and its success so sure, that few will be found to advocate even the preliminary trial of massage in any case of acute abdominal trouble. Where a surgeon's help cannot be secured quickly, or the circumstances of operation are very difficult, the patient should be given the only chance available.

At the present time no one could be found to advocate massage for *appendicitis* while the appendix remains within the abdomen. When once it has been removed, however, massage frequently finds its *métier*. Operation is by no means the end-all of an attack of appendicitis ; and, although acute danger is averted by the removal of the appendix, there frequently remains much ill-health and suffering. This is due to the typhlitis or perityphlitis that has probably been coexistent. The very fact of the appendix having been diseased is evidence of possible faulty action of the cæcum, as witnessed by the number of patients who give a more or less definite history of constipation prior to the attack which ends in surgical interference. This loss in tone of the cæcum

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(with the inevitable dilatation) is a disaster which the removal of the appendix does little or nothing to rectify. Thus a neurasthenic—so-called—of seven years' standing made a complete recovery when the cæcum had been emptied and its activity restored by massage. Countless patients have submitted to operation in the sure expectation of relief, but have met with disappointment. This could be avoided almost entirely by the subsequent use of massage. The technique will be considered when dealing with constipation.

Now that the value of massage as a remedial agent is becoming more widely recognised, it is possible that some day English surgeons may be induced to enlist its services in the *after-treatment of abdominal operations*. Few realise as yet how potent a remedy it is in the treatment of constipation, or how simple may be the manipulations that suffice to expel flatus. Half the discomfort that follows laparotomy is due to flatulent distension of the bowel, a discomfort that is magnified tenfold by the use of aperients. By the judicious use of massage, it should be possible to avoid this cause of suffering entirely. Often all that is required is friction of the iliac colon, so that the hand need only touch the patient's skin over a small area some two inches to the "south-east" of the left anterior superior spine. This is a rare site for incision, so there should seldom be any cause to move bandage or dressing. Should this fail to secure the desired relief, kneading of the ascending and descending colon is possible through bandages, so that, in any case where a rectus incision has been made, a very good dose of massage treatment can be administered without in any way interfering with the surgical area.

After some operations, *e.g.*, gastro-enterostomy or anastomosis of any kind, the surgeon relies on the formation of adhesions to secure his junction. After nearly all other intra-abdominal operations the formation of adhesions constitutes a sequel that should be avoided

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to the uttermost. In abdominal massage we have an agent that is well calculated to reduce the formation to a minimum. Moreover, in any case of gastro-enterostomy which has not proved as successful as had been anticipated, massage treatment may convert failure into success. The treatment should not start until four weeks at least after operation, as the union probably does not become organised till then. The technique corresponds to that recommended for atony of the stomach.

If massage is of value as a remedial agent after abdominal operations, it is not less so in *obstetrical work*. Anything more grotesque than the treatment many women receive after child-birth is difficult to imagine. They are told to take at the exercise they reasonably can manage in order to keep in health up to the day of confinement ; then they are kept in bed devoid of any exercise for three weeks. In addition to this the abdominal wall has been severely stretched ; then the stretched muscles are placed under a most unwonted strain, it may be for hours. Small wonder then that, when the stretching is relieved and the strain is over, the muscles simply "give out" and remain flabby and torpid. Nothing is done to restore the tone and power of the stretched—and, when relieved, weakened—muscles ; and an inert binder is applied to maintain the intra-abdominal tension, which hitherto has always been the duty of the freely-acting muscles of the abdominal wall. The result is that the bowel is deprived of the "internal massage" that it has always received during respiration, and a tendency to constipation is inevitable. Add to this the fact that the expulsive powers are materially reduced, and it becomes evident that it is only reasonable to expect that the patient will have difficulty with defæcation and urination. This means that there will be faulty absorption from the bowel, and the sudden lack of exercise entails a decreased elimination of waste products. Further, the portal circulation is deprived of the chief source of assist-

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ance, namely, the contraction of the abdominal muscles. Then, when the patient is allowed up, the anterior abdominal wall is flaccid, so that, failing adequate artificial support, enteroptosis is assured to a greater or less extent.

The avoidance of all these evils is a simple matter. Thirty-six to forty-eight hours after confinement a short *séance* of general massage to both legs and arms should be undertaken. This need only occupy some twenty minutes, and then ten minutes should be devoted to the abdomen. Attention should be paid in the first place to rendering assistance to the portal system (see p. 297), then the stomach should be given a short treatment (see p. 291), and the colon should next be dealt with as for constipation. Stroking and pétrissage of the abdominal muscles "spaced" with voluntary contractions terminates the *séance*. This should be the daily routine throughout the period that the patient remains in bed. The amount of exercise prescribed is increased daily, either by increasing the number of contractions of the muscles or the duration of the holding of the contractions. No body movement should be allowed as the result of the contractions till the lochial discharge has ceased. Then leg and trunk raising exercises may be ordered, and breathing exercises are added, which involve the use of the accessory muscles of respiration. By the end of three weeks a full dose of exercise should be performed at least twice daily.

The author has heard the sweeping statement made that in one part of the world a large percentage of women of the upper classes go completely "smash" after the birth of the first child and "are never the same again afterwards." It is certain that the amount of visceroptosis to be discovered amongst matrons in this country is a blot on the foresight of their medical attendants. There can be no excuse for the frequency with which a pathological change follows a purely physiological process. Nature could not be guilty of so grievous an error; therefore human management must be at fault. The remedy is simple.

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Colitis is "a secretion neurosis of the colon" (Osler). It is almost always associated with some irregularity of the central nervous system, approximating in its nature to neurasthenia. The more we see of this extraordinary complaint the deeper seems the mystery of its pathology. This being so, it is evident that treatment must be largely empirical.

There are two main types of colitis—mucous and ulcerative. It is probable that the latter is an infective disease, and serum or vaccine treatment often alleviates, if it does not cure. It is usually associated with diarrhœa, blood occurring in the stools from time to time. All local massage treatment is of course contra-indicated. Massage may be prescribed in order to overcome insomnia or to maintain the nutrition of the limbs. Stroking and rhythmical kneading of the limbs and back are indicated for the latter, and surface stroking only (as for neurasthenia) for the former.

In the case of the mucous variety two facts only are outstanding, the first being that it is almost always possible on palpation to feel one or more pieces of bowel in spasm, or at least to note with what ease spasm can be produced in response to the trivial stimulus of gentle palpation. The second fact is that the victim instinctively seeks warmth for relief, and it is not uncommon to find that she—the patient is almost invariably a woman, though occasionally a man in an advanced state of neurasthenia may suffer thus—has acquired the habit of crouching before a fire with the bare back exposed to the warmth. This occurs when alleviation of the pain and discomfort becomes the one overwhelming necessity of existence.

All treatment has so far failed to cope with this very distressing complaint, when it occurs as an isolated manifestation of central nervous disturbance. The Plombière treatment meets with a varied amount of success. It consists of massage applied vigorously to the abdomen after the administration of a copious fluid injection. Spasm being one of the features of the disease, it is probable that the beneficial effect is largely due to

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actual stretching of the muscle fibres that have been accustomed to contract spasmodically, while the heavy massage is calculated to enhance the inhibitory action of the stretching. No one should ever undertake this highly specialised and drastic treatment unless qualified to do so by adequate training, and then only under strict medical supervision.

Treatment by massage should be guided by these facts—first, that the disease is a neurosis ; second, that the patient instinctively seeks for warmth over the spinal column (and often applies hot-water bottles to the abdomen as well) ; third, that inhibition gives relief.

As a neurosis, no form of “stimulating” treatment can be tolerated, and nothing but surface stroking should be administered. Any pressure exerted on the abdomen during massage—unless, as in the Plombière treatment, very vigorous over a colon previously distended—is calculated to excite spasm. The main area of the body that calls for attention is the back, this being the spot where the patient knows instinctively that the application of heat will give relief. The massage should consist, therefore, of back stroking only as advised for the treatment of neurasthenia. Every care should be taken to avoid chilling the patient, by keeping her adequately covered, and by paying due attention to the temperature of the room. If the patient is then conscious of any discomfort—if indeed she does not experience a most luxurious sense of ease and comfort—the technique is probably at fault, as the number of patients to whom this treatment is inapplicable is negligible. Surface stroking of the limbs may be added in any case where there are signs of general irritability. Later on, rhythmical kneading of the limbs may be added. In all cases which present any symptoms of insomnia, massage should be applied to the head and neck (see p. 226). Last, if inhibition brings relief, arguing from the relief of spasm that can be secured in voluntary muscles by surface stroking, an attempt should be made to inhibit the bowel spasm by firm surface stroking of the areas supplied by the inter-

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costal nerves. The movement should begin near the mid-axillary line and pass downwards and forwards to the mid-line. For the sake of emphasis it is well to repeat that every effort should be made to avoid exerting any pressure that can possibly excite reflex response to mechanical stimulation.

All too infrequently the aid of massage is invoked for the treatment of *constipation*, as it affords one of the few chances of curing this very distressing complaint. As a rule constipation is an acquired evil, and often is attributable to errors in the physiological life of the individual rather than to pathological changes. In seeking to cure, we must bear in mind the proverb that "habit is second nature," and aim solely at securing a regular habit. The reason why aperients fail to cure is that the irritation they produce becomes an essential part of the "habit"—no irritant or stimulus, no action.

Massage, of course, is unable to cure when the physiological error is continued, but there are some pathological causes that can be remedied. Amongst the causes of the latter type most frequently encountered is dilatation of stomach or of cæcum. For either trouble massage alone offers a prospect of cure. Suitable anastomosis by surgery may effect a cure, but the result is always a matter of profound speculation, whereas massage treatment, though often slow, is almost always certain. At least it can do no harm if skilfully performed, which is more than can be said of surgical interference in these cases.

For massage to be a success, the physiology of the case must be studied and all errors—dietetic and hygienic—must be corrected. For this reason, if for no other, the masseur should never risk a reputation by undertaking to treat a patient for constipation, until the whole situation has been thoroughly investigated by a medical man. The danger becomes more obvious still when we remember that the sudden onset of constipation in an

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elderly patient is frequently the first symptom of malignant disease. It is plain, therefore, that ethical considerations and the interests of the worker go hand in hand.

But, to be of full service to patient and doctor alike, a knowledge of the causes of constipation is essential ; as it often happens that the masseur can extort information from the patient, in conversation or by observation, that might be missed during the ordinary professional visit of the medical man.

First and foremost is the question of habit. Many people owe the origin of this complaint to lack of supervision during the early days of life. In others the habit begins with the lack of provision of adequate time between breakfast and the start for morning school. In later life similar causes operate, and, in quite a short space of time, the habit of a lifetime can be broken. There is an undoubted natural tendency in some individuals to be constipated, and these fall the easier victims.

Second in importance as a cause of constipation errors of dietary must be considered. In this country—and particularly amongst women—lack of fluid is an error responsible for much evil. To maintain a physiological balance at least three pints of fluid should be taken into the system daily. It is not at all uncommon to find that a female victim of constipation has been in the habit of taking no more than a half, a third, or even less, of this minimum. We might well follow the example of our American cousins in water-drinking, while avoiding the “cocktail,” which is not essential for maintaining the intake of fluid.

Over-feeding entails over-loading of the bowel, but the presence of bulky excreta should not of itself cause constipation. Indeed, the reverse is true, for the more work we give a muscle to do the more its strength will develop. Hence the cures effected by agar and its preparations. But over-feeding combined with sedentary habits must be reckoned as a cause, and this fact indicates the line of treatment. When exercise is cut off there is always a tendency to constipation, chiefly

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on account of the lack of the natural "massage" of the abdominal viscera, which is inseparable from every movement of diaphragm and abdominal wall. Flaccidity of the abdominal wall must then of necessity be classed as another distinct cause.

The possibility of poisoning from drugs and such things as paint (plumbism) must be kept in mind when searching for the cause of constipation; and it is not infrequent to find it concurrent with inflammatory conditions in various parts of the bowel, *e.g.*, colitis, chronic appendicitis, and chronic gastritis. After nearly all abdominal operations there is a marked tendency to constipation, which is directly proportional to the severity of the handling to which the bowel has been subjected. In cirrhosis it is common, and pressure on any point, or narrowing, will obviously impede the passage of the intestinal contents. Under this heading the possibility of "kinking" or of the presence of adhesions must be considered. The former is a not uncommon cause in all cases of general visceroptosis. Muscular spasm alone may suffice, as in colitis. Muscular atony of any part of the bowel must of necessity impede the onward flow of the contents of the bowel, and atony of the cæcum is doubtless responsible, when appendicectomy fails to effect the cure that has been anticipated.

Last we may place as a not uncommon cause the lack of efficient innervation which follows any serious disease, particularly if there has been sepsis, and neurasthenia. It may be a purely hysterical phenomenon, and is particularly common amongst the insane.

Considering the variety of the causes of constipation, it is no matter for surprise if, in the absence of information as to the cause, treatment should fail, or even, it may be, inflict injury. For instance, sacral beating may prove a most efficacious remedy for the plethoric patient who owes his trouble to over-eating and too little exercise, while it will inevitably aggravate the trouble if the patient is suffering from the faulty innervation of neurasthenia.

Treatment must be administered only after due con-

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sideration of the cause. We find that there are four main groups of cases, and treatment must be designed to suit the special needs of each group. The first comprises the victims of habit, and those in whom the trouble arises from taking an insufficiency of fluid, from poisoning, from disorder or disease of various portions of the bowel or the liver, from visceroptosis and kinking, or from muscular atony, and also post-operation cases.

The second comprises cases in which a definite accusation of over-feeding and insufficient exercise can be established, and hysterical patients.

The third should include all cases of deficient innervation from whatever cause.

The fourth comprises all those cases in which the constipation is due to the presence of growths in the bowel, to narrowing by stricture of the bowel, or to pressure from external growths or tumours. It should also include most cases in which there is obstruction by bands or adhesions, and all cases in which the constipation is dependent, in whole or in part, on the presence of irreducible herniæ.

Massage should ordinarily find no place in the treatment of a case of constipation the origin of which can be traced to any of the causes mentioned in group four. Occasionally it may be used in an attempt to stretch intra-abdominal adhesions. The chance of success is small, and there are possibilities of damaging a piece of bowel that is attached to, or pressed on by, the adhesion. Great care should therefore be exercised, and treatment should consist of slow, steady, and gentle pushing movements. If possible, the abdominal wall may be picked up and tension made on the adhesion by gentle pulling.

Treatment for cases comprised under the third heading should follow on the lines advocated for the treatment of neurasthenia. The constipation is purely secondary, and depends for its cure on that of the main illness. To try to enforce activity by direct massage is to risk the effects we should expect from flogging the over-tired horse. Slow, gentle, rhythmical stroking over the

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ascending and descending colons—provided, of course, that the abdominal wall is perfectly relaxed—will help the local condition, but nothing in the form of vibration of the iliac colon or of an attempt to secure the gluteal or sacral reflexes should be allowed.

In treating the hysteric, the glutton, or the *bon-vivant* we can go “all out.” For reflex effect the patient should

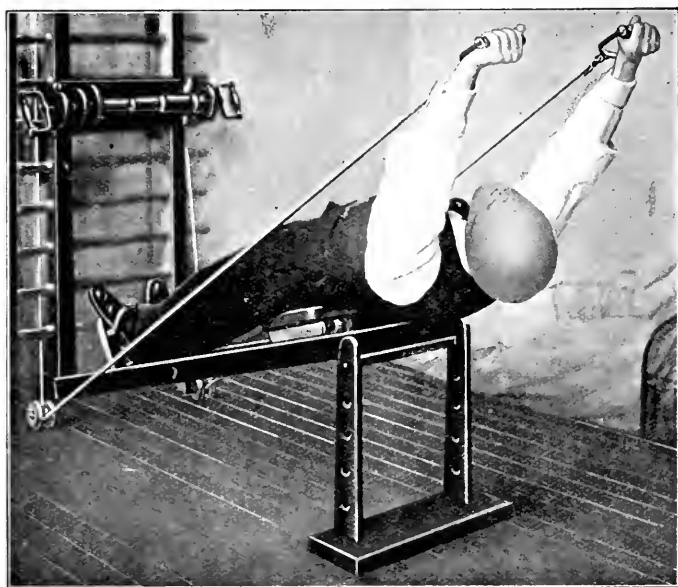


FIG. 133.—To show how the use of the sliding-seat and of the weight and pulley can be combined to afford a full dose of exercise to most of the muscles in the body.

be treated prone, and a firm beating over the sacral region may be administered with the ulnar borders of the clenched fists. In addition to, or instead of, this treatment, the patient is rolled on to the right side, the pillows are taken away, and the back is bowed. The left hip is well flexed and hacking is administered to the gluteal region. Then the patient is placed upon the back with the pillows under the head, so arranged that the shoulders also are slightly raised and the knees flexed

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over another pillow. Deep stroking of ascending and descending colons is then performed, an occasional break being made for vibration over the iliac colon. However vigorous our treatment may have been thus far, it must not now be other than slow, gentle and rhythmical, and the vibrations must be well spaced.

Gentle kneading over the region of the gall-bladder follows—the chest over the liver area may be hacked, if so desired—and then the pillows are taken away from the head and shoulders and placed under the thighs and knees so as to secure a marked flexion at the hip-joints. Every assistance is now given to the portal circulation, and the local portion of the *séance* has come to an end so far as the actual massage is concerned. Many of these patients require treatment for obesity (see p. 275), and, as is usual in nearly all massage work, the prescription of exercises is absolutely essential to success. In every table breathing exercises should find prominent place (see Fig. 133). A little general massage to the back and to the limbs will not be out of place.

When treating the cases classified together under the first group due regard should be made to the requirements of each individual. The victim of habit will derive most benefit from stroking of the ascending and descending colons and friction of the iliac colon. Even the old remedy of rolling a five-pound cannon ball over the colon may suffice. But treatment will prove unavailing unless the necessity of establishing a regular habit is insisted upon, and to this end a pipe or cigar between breakfast and the start of the day's work may prove of valuable assistance. Sometimes a glass of cold water after breakfast may prove efficacious, or even a compulsory pause for reading or needlework.

In children colon stroking is usually all-sufficient if the dietary is correct. Iliac friction, sacral beating, and gluteal hacking should be absolutely prohibited, especially in boys.

When poisoning is the cause of the trouble, it is very

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important to assist the portal circulation to the limit of our power, so that the poison may be eliminated with all possible speed.

In all cases of visceroptosis or kinking it is well to raise the foot of the bed on two chairs before beginning treatment, and gentle alternate pressure and relaxation may be applied to the whole of the abdomen in the hope that the general movement within the abdomen may help to "straighten things out." The pressure should be applied during expiration, and relaxation should coincide with inspiration. The muscles of the abdominal wall are almost sure to be poor in quality and quantity, and exercises should be given "spaced" with massage, chiefly of the picking-up variety. Faradism, particularly with the Bergonié chair, may prove invaluable.

Care must be taken to give treatment applicable to any stomach disorder that may be present. The treatment of colitis has already been considered.

If, as is sometimes the case, the cæcum has become a huge dilated reservoir, the patient should be treated as for visceroptosis. All attempts to empty it should be governed by laws similar to those laid down for the treatment of œdema, of which it has been said that it is useless to try to empty the bottle with the stopper still in place. Indeed, in all massage of the colon it is necessary to apply our treatment to the distal portion before attacking the proximal. When treating this type of case it is sometimes of service to elevate the foot of the bed.

Post-operative cases are not suitable for general abdominal massage owing to the presence of the wound. But there are few cases in which it is impossible to apply vibration to the iliac colon, and this simple remedy will often suffice to relieve.

The most famous spot for the treatment of "*liver complaints*" is, without doubt, Vichy. The treatment consists in the main of a fine spray douche over the

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hepatic region, followed by general kneading. The skin area over the liver is then treated by squeezing, gentle tappings with the palmar surfaces of the fingers follow, and finally the lower liver edge is subjected to very gentle kneading. The result is a feeling of general buoyancy and relief. It is stated that the liver is emptied of its fluids, the circulation through it is benefited, absorption is hastened, and the flow of bile increased. This stimulates the flow of pancreatic juice, and hence aids the absorption of fats. It also aids peristalsis and helps to relieve constipation. No account is taken of the regular hours, the enforced exercise, the administration of fluid internally, and the more or less strict dietary.

The improvement of patients at Vichy is of course beyond question, but where so many agents are at work it is difficult to be certain that to any one of them should be ascribed the glory of success. For instance, it would seem to be not improbable that the increased fluid intake might dilute the bile, while the massage for aiding the portal circulation would assist the circulation through the liver and thereby stimulate all its functions. This seems a far more reasonable supposition than that the end is secured by kneading the lower edge of the organ—a very small portion of it can be reached directly—or by comparatively gentle taps on the surface which have to be submitted through the chest wall. In life the liver is little more than a semi-solid organ—at best, contained within a firm fibrous capsule, as anyone who has watched the process of sewing up a rent in it can testify. This being so, the contents of the liver capsule must be subject to the universal laws of hydrostatics. Also we have seen that the other abdominal contents as a whole may be considered *en masse* as being semi-solid, so that any pressure exerted at any point must be transmitted equally in all directions. Hence during any form of abdominal massage, when any noticeable degree of pressure is exerted over an appreciable area, this pressure must in turn be submitted to the liver substance. It is thus in every-day life that the liver receives its daily dose of massage

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with every movement of diaphragm and abdominal wall. Doubtless this is the physiological version of the adage "Laugh and grow fat," and the explanation of the great value of a ride on horseback when a little bilious.

It is possible that we may be able to influence the liver, in some way unknown, by reflex as a result of surface stimulation, just as we can excite the stomach to activity. But, putting this possibility aside, the direct effect of massage on the liver must remain non-proven. To influence the liver and its functions by massage we can aid the circulation through it, and we can also doubtless imitate nature's own treatment of indirect massage *via* the abdominal wall by general abdominal massage. We can go further still and massage the organ from above by prescribing breathing exercises.

Anyone who has been called upon to attend any considerable number of cases of jaundice must have been struck by the comparative frequency with which the symptoms begin to subside from the moment examination is made. This is usually attributed to skilful prescribing. Yet the careful physician never fails in any suspicious case to palpate the gall-bladder, and it is always possible that the "cure" originates in this simple act. The examining hand is pressed firmly down below the costal margin and the patient is told to draw a deep breath. Considerable pressure must be exerted on the contents of the bladder, and the unstriated muscle in its wall—little though there may be—is stimulated to contract. This must assuredly raise the pressure of the bile and tend to drive onwards any impeding plug of mucus.

At least it may be said that nothing but good can come if, as part of the routine treatment in general abdominal massage, we give a few gentle kneading movements over the gall-bladder during inspiration. Local treatment may be added in the hope of securing reflex effect.

Massage of the kidneys can produce a flow of urine and may be used for the purpose of aiding diagnosis

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during a cystoscopy. The kidney is "milked" between the two hands, or between the fingers and thumb of one hand, during inspiration. In no other circumstances should this treatment be administered. The organ is far too delicate for mechanical treatment to be free from danger. In fact, palpation of the kidney leads instantly to a transient albuminuria. Countless experiments have shown, however, that the output of urine is increased by massage and that the percentage of solids excreted is also increased. The total output of solids is therefore very considerable. Massage of the limbs alone can attain this end, but abdominal massage has a far greater effect, particularly if applied with the object of assisting the portal circulation.

Massage is sometimes invoked as part of the treatment of patients suffering from movable kidney. So many people—particularly women—have movable kidneys, and remain for ever in blissful ignorance of the fact, that it is impossible not to wonder whether those who are conscious of it are not really suffering from some general hypersensitiveness of the central nervous system. This is tantamount to saying that most of those who recognise symptoms from the mobility of the organ are in reality suffering from neurasthenia. Much benefit can be derived from rest and massage treatment; but the latter must be general, and in the earlier stages, at any rate in part, should be of the type mapped out for neurasthenia. If the neurasthenic symptoms are not a prominent feature in other directions, then general abdominal massage should be administered. Every endeavour should be made to get the patient to put on weight, so that fat may be deposited in the kidney-bed. As the usual cause of the trouble is laxity of the abdominal wall, every means should be employed to build up its muscles. The chief of these means is the prescription of a course of exercises, very mild at the outset and increasing in severity very gradually day by day. Breathing exercises should be a prominent feature of all such tables.

Atony of the bladder may be remedied to some slight

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extent by massage in two ways : first, by reflex as the result of sacral beating ; and, second, by kneading just over the pubes. Massage of the prostate is best left in the hands of the surgeon. There is always risk of spreading infection locally, and, if this must happen, it is better that he alone should take the responsibility.

On the Continent with some frequency, and occasionally in America, advocates of massage for the female pelvic organs are to be found. In this country the treatment has rarely, if ever, been extolled ; it can only be regarded with mistrust, and had better be left alone. The only form of internal massage that might possibly be given a trial is that devised by Professor Turch. In cases of hæmorrhoids, when operation is refused, he inserts a rubber bag into the rectum and attaches this to a Politzerising bulb. The pressure of the air in the bag is alternately increased and diminished, with, so he claims, considerable benefit to the patient.

CHAPTER XXV.

MASSAGE TREATMENT FOR DISORDERS OF THE CIRCULATORY SYSTEM.

GRAHAM in his text-book on Massage states: "In almost every conceivable form of weak and diseased heart I have been called upon to do massage, and usually with marked relief and comfort, before Schott or Oertel were ever heard of. While it was being done and for some time after, the patients have generally been able to lie on either side or flat on the back, and often to go to sleep in this position—what they could not have done before. In other cases, when it was possible for them to lie down at all, I have masséed with relief until within a short time of their deaths." He also gives the accounts of different observers of the effect of massage on the heart. Very considerable reduction in size can be noted through the fluorescent screen after massage. A similar effect can, however, sometimes be noted by spraying the precordium with ether. This would prove beyond question that it is possible to secure some form of reflex effect upon the heart by local treatment. Experiments to ascertain whether the spraying of other parts—say the back or abdomen—would have a similar effect are not apparently recorded. Without this "control" the evidence of direct reflex *viâ* the precordial area must be considered as inconclusive. Most of us are familiar with a sensation of breathlessness when our feet first touch the water on a cold day, as we enter the sea for our morning bathe. This may well owe its origin to reflex action on the heart.

One physician, whose opinion commands respect by reason of wide experience of the treatment of heart cases by massage, affirms that the benefit of local heart treat-

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ment is psychical and not physical. This is probably true, and, if so, the treatment is obviously safe. If mechanical effect is secured it can only be regarded with doubt and misgiving.

We know, however, that one of the main causes of the symptoms of muscle fatigue is the accumulation of waste products within the muscle. The victim of heart trouble is always deprived of exercise, by which alone this poisonous material can be eliminated with success. Moreover, if a heart is weakened by disease, the kidneys rarely, if ever, perform their function efficiently. Thus it comes about that the heart-muscle must inevitably be fed by blood rich in waste products. The muscle fibres are therefore "fatigued" by poisons circulating through them, and, being weakened, they are all the more susceptible to this malign influence. A vicious circle is thus established. The heart fails, waste products collect, and the heart fails still more.

The objective in view when massage is ordered in any case of failing heart, from whatever cause, is therefore plain. It is to aid the elimination of waste products and to assist the heart's action, as far as lies in our power, by lowering any resistance which may be present in the venous system impeding the arterial circulation. Both these objectives can be secured by massage treatment, but there is yet another way in which massage can aid our patient. It has been said in an earlier chapter that a dose of morphia or heroin can do more to stimulate the heart's action, in suitable cases, than all the stimulants in the pharmacopœia combined, simply by affording the patient sleep and rest. Massage can effectively replace this dose.

When called upon to treat a heart patient we should therefore always aim at securing a marked sedative effect from our massage. Indeed, this may be all we are called upon to do during the earlier stages. If the patient is restless, in distress, and tired from lack of sleep, we have in massage the best remedy of all for him. Surface stroking of head and neck may be all that the sufferer needs to

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ensure several hours of profound sleep. In a few days similar treatment of the arms, and then of the legs, may be added.

As soon as the patient's capabilities of resting are showing signs of improvement, the surface stroking should gradually be replaced by deep stroking, given about the middle of the treatment devoted to each limb. As the patient improves, kneading of the limbs may be added, in order further to assist the circulation. This movement should be performed slowly, gently and rhythmically, and the *séance* should always begin and end with surface stroking. The patient thus experiences the sedative effect of the treatment, and, at the same time, we are able to secure an increased output of urine and to give a considerable impetus to the elimination of waste products. The assistance we give to the venous flow also decreases the work of the heart, and so we are attacking the vicious circle at all points.

As soon as kneading movements can be performed with benefit, it is well to commence the administration of relaxed movements. These, by allowing the alternate lengthening and shortening of the muscles, maintain their contractility, assist the venous flow, and stimulate the circulation through the parts moved. The patient is then taught to contract various muscle groups actively, even though no active movement is allowed to follow as the result of the contraction.

Presently the patient will be able to submit to abdominal massage. Previously this may have been impossible, as patients with valvular disease and failure of compensation are rarely able to lie down. If the trouble is due to asthenia of the muscle from any cause—usually strain, as the result of excessive training or exercise, fatty infiltration, or some prolonged septic illness—the patient will find difficulty in sitting up. Massage treatment is contra-indicated for cases of fatty degeneration and all acute endocardiac conditions. We have, then, a sure guide as to when it is wise to begin abdominal treatment, namely, in cases of valvular disease as soon

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as the patient can lie down, and in cases of myocardial trouble as soon as he can sit up.

Abdominal massage may be administered to help remedy any constipation that may be present, but its main objective should be to assist the portal circulation. This has been shown to increase the percentage of solids excreted in the urine more than general massage of the whole of the rest of the body.

Hitherto the effect of massage has been considered so far as it aims at securing sedative effect and at assisting the elimination of waste products. That benefit can also be derived directly from the mechanical assistance to the circulation is beyond question.

In the first place, the toning-up of the vaso-motor system in the extremities will secure a more efficient blood supply through them. This ensures a more even blood supply throughout the body, the capacity of the "reservoir" of the blood is thus, as it were, increased, and the work of the heart is correspondingly lessened.

Then, again, every assistance that is rendered to the return of blood to the heart, by affording a *vis a fronte*, must tend to decrease the *vis a tergo* that is required to ensure adequate circulation. This affords a further saving in the expenditure of cardiac energy.

As strength and general vitality return, due to improvement in the capacity for rest ; as the toxæmia decreases, due to the elimination of waste products ; as the heart gains in strength, due to the mechanical assistance we are able to afford to it ;—so the general condition of the patient improves. Appetite returns, and with it there is increased assimilation of nourishment, and so strength improves, till, finally, the patient is able once more to resume exercise, by which alone health and strength can be fully restored. Surely, then, in massage, we have a rational treatment for all cardiac cases. Treatment by rest and drugs without massage is unscientific, in so far that it aims solely at remedying the main organ affected, and ignores the desirability of treating all the concurrent evils which must inevitably be present, and

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which, by physical rest alone, must be augmented and even multiplied. Even from the psychical point of view, active treatment in the form of massage must be held as immeasurably superior to rest alone and the regular administration of drugs. When we add to this the increase in comfort that efficient massage is able to convey, that the treatment hour forms the brightest spot in the tedious monotony of a long day, and that undoubted physical benefit can be assured, then we can realise how greatly it is possible to benefit these patients.

Treatment by rest of victims of cardiac trouble can be likened to the treatment of recent injury by immobilisation, the administration of drugs corresponding to the fixation by splintage. But the use of splints (or the administration of drugs) is in no way incompatible with treatment by mobilisation and massage, and by these means we are able to secure adequate rest to the parts that require it, while maintaining the health and vitality of all the other structures. Indeed, it has been proved experimentally that certain drugs have their efficacy improved by the administration of massage.

In the later stages of cardiac treatment the use of the Bergonié chair is invaluable, and should always be given a trial whenever practicable. Massage and mobilisation, however, provide a very efficient substitute.

Later still exercises must be prescribed. The brothers Schott have elaborated a special system at Nauheim. There is no reason why treatment should prove less efficacious in the privacy of the home. The exercises consist solely of carefully graduated relaxed and resistive movements, which in turn prepare the way for active movements. Breathing exercises should, of course, be given prominent place in any table of free exercises.

Throughout treatment a careful watch must be kept for any trace of fatigue. This is shown by altered respiration, by change in pulse or colour, or by restlessness. It is important that the masseur should be able to take the pulse, and should have sufficient experience to note changes therein. This can only be acquired by practice,

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and it would be well, therefore, if all masseurs familiarised themselves with the normal pulse by examining it in every case treated in hospital or during training. In private work, except in heart cases, such examination might sometimes be regarded with disfavour, and might lead to uneasiness and doubt in the patient's mind.

The treatment of *angina pectoris* has been referred to in an earlier chapter (see p. 236), and also the treatment of *arterio-sclerosis* and its frequent companion, *chronic renal disease* (see pp. 236 and 285).

Disorders of the venous system may be considered under two headings, *varicose veins* and *thrombosis*.

It is difficult to say how, or why, massage treatment should benefit *varicose veins*. The fact remains that it can do so. It is probable that in ordinary life the patient never assumes a postural position which allows the veins to empty completely, and so their walls remain constantly under tension. Massage can at least relieve the tension temporarily, and this may be responsible for the benefit that it can undoubtedly bestow. The treatment should therefore be given, whenever practicable, after the patient has finally retired to bed for the night. Treatment should be of the deep-stroking variety in the main, and should be performed slowly, with just sufficient pressure to obliterate the lumina of the vessels. Any more severe pressure can only tend to inflict injury upon the already stretched and weakened walls of the veins. If hard or tortuous, the veins should be left alone, and treatment be confined to areas where it is possible to assist the collateral circulation. Varicose patches should be avoided likewise. In these the venules sometimes rupture spontaneously, so even the lightest form of massage cannot be regarded as free from danger when applied directly to them. The leg during treatment should be supported by pillows, so that the thigh and knee are both flexed to nearly a right angle. If a bandage is to be applied, this should be done before the position is altered.

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The condition of varicose ulcers—even of long standing—can be greatly ameliorated by massage. In addition to general treatment for the circulation, the whole area for some distance around the ulcer should be vibrated with care. The ulcer itself may be covered by gauze and subjected to soft vibration. All scraping of the surface must of course be scrupulously avoided.

The treatment of *thrombosis* by massage is a very serious problem. If sepsis has been present, it is still more serious. The very life of the patient may be involved by an error in technique.

The signs of thrombosis have been considered (see p. 127), and should be familiar to every massage worker.

Whenever this condition is present, recovery depends on the education of collateral channels to take on the work of that which has been obliterated. Occasionally the obstructed vein may function once again by absorption of the clot, but usually the blood finds its way into other channels.

Treatment should be administered with the double objective of aiding the venous circulation and of reducing the œdema which will inevitably be present.

After aseptic thrombosis, such as in the posterior tibial vein after simple fracture in the leg, massage treatment may be resumed with the utmost care and gentleness some four weeks after the cessation of the spread of the symptoms. Active movements may be prescribed about two weeks later.

After septic thrombosis, on the other hand, as in *phlegmasia alba dolens* (white leg), it is rarely safe to begin massage till two months at least have elapsed. Treatment should consist of surface and very gentle deep stroking—all the muscles, of course, being completely relaxed. Slow, gentle kneading may be given to all structures except to those areas where pressure is likely to be transmitted directly to the damaged vein—e.g., the thigh and anterior part of the leg may be treated

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if the posterior tibial vein only has been affected. The popliteal space, Hunter's canal, and Scarpa's triangle should all be avoided during treatment, if the vein in these areas has been involved in the thrombosis.

Relaxed movements may be given, but with caution. Active movements may be prescribed from the end of the third month. It is not unusual to hear of patients spending six, and even nine, months in bed, so there is no need to "push" treatment—a process that can only be described as dangerous. "General" massage is rarely safe till the fourth month.

The treatment of *hæmorrhoids* has been considered (see p. 315).

CHAPTER XXVI.

MESSAGE TREATMENT FOR DISORDERS OF THE RESPIRATORY SYSTEM.

IN nearly every book on massage much space is devoted to the treatment of scoliosis and similar deformities. Not so here, however, as massage for these cases is of small service. The remedy consists of exercises with which the present work does not pretend to deal. As stated in the preface, though it is well to emphasise it once again for fear of misrepresentation, I have only attempted in these pages to indicate how the movements of massage should be performed, what effects we may reasonably expect to secure as the result of these movements, and what our aim should be when called upon to treat various conditions.

As already stated over and over again, massage is merely a means to an end, and that end is restoration of function. If it is true that "movement is life," massage alone as a remedial agent can rarely, if ever, suffice to cure. It can prepare the way for, and can assist in, the performance of the one and only means by which function can be fully and finally restored—the prescription and performance of suitable exercises. It is impossible to record these here, for they cover the whole realm of Swedish educational and remedial exercises.

Massage pure and simple plays but a small part in the treatment of deformities of the chest or of diseases of the respiratory system. They can therefore be dismissed in a few words.

Laryngitis, even in its acute stage, is amenable to massage treatment; in the chronic stage great benefit can be bestowed on the patient. The ordinary "clergyman's sore throat" is purely due to posture. The bar-

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risters, who always speak with their chin raised to an audience placed above them, never suffer from any vocal effort. Many clergymen who address their congregations from a pulpit do so. Keith has assured us that the human larynx could not have been perfected without the assumption of the upright attitude. As a prophylactic, then, it is our duty to teach anyone, who has to strain his voice, to do so with head well thrown back, and no evil will follow even prolonged strain. Those who cannot learn this trick can derive the utmost benefit, if we teach them to stroke their own necks downwards for a few minutes after every occasion on which they are called upon to do much speaking.

In all cases of acute laryngitis—except, of course, in septic cases such as those of Ludwig's angina, when massage is strongly contra-indicated—great relief follows rhythmical down stroking of the neck (see Figs. 113 to 115, p. 225). The *séance* should be short, not lasting more than eight or ten minutes.

Massage treatment in *acute bronchitis* can rarely, if ever, be advocated. It might be possible to assist the expectoration of "sticky" mucus by very gentle hacking over the apices and the back. The clothes should not be removed, as no exposure whatever is permissible. Massage treatment of the head and neck might help a patient who was suffering from insomnia.

In *chronic bronchitis* there is almost always a certain amount of chronic over-distension of the air-spaces of the lungs. Thus the treatment of chronic bronchitis may be considered together with that of emphysema.

Mont-Dore is the elysium of sufferers from these complaints. The treatment consists of douche treatment applied to the thorax, and subsequent inhalation; the amplitude of respiratory movements is definitely increased thereby. But, as Graham points out, massage treatment is of far greater general application, and is available for those who cannot visit the South of France. Moreover, he quotes cases to prove that massage alone can very nearly equal the douche in improving respiratory move-

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ment. So, when we remember that to massage movements proper we can add compression movements and exercises, it would seem that much can be done to aid patients in their own homes.

Local massage treatment should consist of deep stroking and kneading of the intercostal muscles and of percussion over the apices and back—the former for the amelioration of the actual chest movements, and the latter to loosen mucus.

But it is well to remember that the emphysematous patient can rarely take adequate exercise, and that often the heart is enlarged. Treatment should therefore follow closely on the lines laid down in the previous chapter when dealing with disorders of the heart. The right side of the heart is the one that suffers most in these cases, and so there will be definite indication for abdominal massage, designed particularly to assist the portal circulation. Many of the patients will be found to suffer from flatulence, so massage of the colon will frequently be indicated; many also are obese, and appropriate treatment should be added. But the real agent through which alleviation comes is exercise, suitably designed and adequately taught. Massage can prepare the way; in no case can it supplant treatment by exercises.

Little can be done to aid the sufferer from *bronchiectasis* by massage; but it would always be kindness to instruct parents to administer mild hacking and clapping over the bases of the lungs during the morning evacuation of pus. It might well hasten this most unpleasant process.

Graham reports a paper published by Schlegel advocating the use of percussion in cases of *pleuritic effusion*. "For this purpose the ulnar border of the hand was used striking at the rate of two blows per minute" for five minutes, two *séances* being given daily. Non-infected pleuritic effusion is usually absorbed without difficulty. Failing this it can be relieved by tapping. If it were infected, percussion could hardly assist in the cure. It is not likely, therefore, that we shall be asked to deal

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with any case of pleurisy. It is a fact that there is some connection between the surface of the chest and the lungs, and it is possible that the pain of pleurisy might be alleviated by frictions over the intercostal muscles. On auscultation it is usual for the patient to complain that some spots are tender when touched by the stethoscope. Friction over these points might well afford relief by reflex.

The treatment of *empyema* is almost entirely a question of exercises. They should be designed to mimic as far

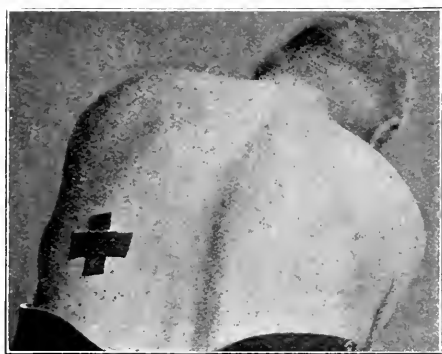


FIG. 134.—To illustrate the position for a special breathing exercise when the patient has suffered from a left-sided empyema. The hand of the masseur is placed over the area marked by the cross, and the patient endeavours to push the hand away during inspiration.

as possible Abbott's treatment for scoliosis by means of the plaster-jacket. In other words, the patient should be taught to expand the base of the lung of the side affected, when, by posture, the chest wall over this area is submitted to the fullest degree of tension that is possible. Thus, for a left-sided empyema, the patient is placed in the lax-stoop-sitting position. The trunk is then rotated to the right and the forward bend is accentuated. A hand is now placed over the left lower ribs behind, and the patient is instructed to try to push the hand away during inspiration (see Fig. 134). Other

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remedial and educational exercises should be prescribed as the nature of the case permits, particularly valuable among the former being lateral costal breathing and one-sided breathing exercises, arranged in order of progression. Blowing the child's windmill is an excellent exercise.

Massage treatment, if required, should be purely symptomatic. There are no definite indications.

CHAPTER XXVII.

THE TREATMENT OF DEFORMITIES.

It is usual in text-books on massage to devote a separate chapter to the treatment of deformities, and I have chosen to follow the usual practice in the hope that I may be able to emphasise the fact that, in their treatment, massage plays but a small part. It may, however, serve as an important accessory.

The question to be solved is how best we may assist the orthopædic surgeon. We may be called upon to prepare the way for operation. This usually means that massage is required to promote the nutrition of the part. The laws laid down elsewhere should serve as an efficient guide.

Occasionally massage is invoked to aid in the prognosis of a case. When this is done it is essential that the surgeon in charge should give minute instructions as to the manner in which he wishes the case to be treated and state the *raison d'être* for the instructions given. His wishes must be obeyed loyally; beyond this it is impossible to offer advice.

After operation, massage may be prescribed to restore or to maintain the circulation, or to prepare the patient for a course of exercises and to assist him in their performance. Again, the general rules laid down elsewhere should prove sufficient guide.

Either before or after operation it may be our duty to loosen scars, to stretch adhesions, restore mobility, and so on. After operation our treatment must always have in view the sole end—restoration of function. This must depend on exercise, and on exercise alone. Massage can merely assist. It is only possible here to lay down general rules for treatment. The most important are, first, that

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if massage is given at all, the whole limb, or at least the whole segment of the limb, must be treated and not only that which is adjacent to the site of operation. Indeed, this should usually be the last part of the whole limb that we should treat.

Then, second, if the surgeon has endeavoured to stretch some structure, the table of exercises should always be framed with a due regard to his intentions. This means that every exercise should be designed to lay further stress upon the structures that he has already tried to stretch, and to contract or shorten those that he has tried to relax.

In the treatment of feet, for example, if the surgeon has wrenched a flat-foot and maintained the correction in a plaster case, it is obviously acting contrary to his wishes if exercises are prescribed for the patient that can by any possible means lay strain on the plantar ligaments. Thus the ordinary heels-raising-knee-bending exercise with the toes turned out is absolutely contra-indicated till a very advanced stage of treatment has been reached. Co-ordination exercises, walking on the outer edges of the feet, ordinary walking in boots with the inner side of the sole and heel raised, tip-toe walking with the toes turned in, lessons in standing with the feet parallel and crossed with the weight on the outer borders when sitting—these are all safe and legitimate. On the other hand, if an attempt has been made to flatten out a case of pes cavus, the very opposite line of treatment should be followed. The patient should be instructed in heel-walking and to perform exercises in the lunge position, while heel-raising exercises of whatever description should be avoided till the last.

The treatment of metatarsalgia has already been discussed. For hallux rigidus or valgus little or nothing can be done, save in the very earliest stages, by massage and exercises ; but massage can prepare the way for operation, and can assist greatly if “spaced” between the various exercises afterwards. It is possible also to assist in the maintenance of the mobility of the joint. The ordinary

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laws of administering relaxed movements must be obeyed. It is often of service to put a certain amount of longitudinal tension on the toe while performing the movements. It is essential in these cases to know whether the surgeon has divided the bone completely or not at the operation. In the former instance, as there is a complete fracture progress should be more slow than in the latter, where the fracture (if present at all) is of the greenstick variety.

Little or nothing can be done by massage or exercises for the treatment of hammer-toes. After operation it is vital that we should be told whether the surgeon is aiming at an ankylosis, or wishes to secure a movable joint. In the former case exercises alone should suffice; in the latter, the joint should be kept supple in so far as full extension is concerned. No attempt to secure increase of flexion should be made.

Deformities of the lower extremity other than those mentioned rarely find their way into the massage-room for treatment. Occasionally a case of hysterical spasm may be found. If there is no obvious and very definite sign of immediate improvement, the sooner treatment by massage is abandoned the better for all concerned. Paralytic deformities call for treatment on the lines laid down respectively for that of flaccid and spastic paralysis.

Spinal deformities rarely need massage treatment at all, though it may be useful occasionally to "space" a few minutes' treatment between the various exercises. The main objective is to provide a sort of general "refresher."

The treatment of torticollis and of Bell's palsy (facial paralysis) have each been considered.

Paralytic deformities of the upper extremity call for treatment designed to suit the nature of the paralysis. All that need be said here, and that only by way of emphasis, is that on no account whatsoever should any muscle affected with a flaccid paralysis be allowed to stretch.

Other deformities owe their origin to bony deformity, to adhesions or to fibrous trouble of some sort or another.

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In cases of bony deformity we may be asked to make the best of a bad job, such, for instance, as training a patient to use his scapula so as to reduce the disability caused by anyklosis of the shoulder to a minimum, or we may be asked to prepare the way for operation. The former involves the prescription of exercises, possibly "spacing" in a little massage during the early stages, and using it as a means of affording relief if an error is made in attempting to push the patient along too quickly.

Only two named deformities call for special notice. These are Dupuytren's contracture and Volkman's ischæmic contracture.

Dupuytren's contracture can, I firmly believe, be prevented from causing deformity if the trouble is detected early enough, and the patient is instructed to perform for a few minutes twice daily the exercise of hands clasping and turning spaced with a little deep kneading of the palm. Otherwise, when the deformity is fully established nothing seems to be really effective save the removal of the head of the proximal phalanx, in a manner similar to the corresponding operation for hammer-toe when it is intended to leave a movable joint.

Massage treatment is constantly recommended for the treatment of ischæmic contracture. It is a slow and tedious affair and cannot be compared in efficacy or rapidity with treatment by splintage. But there is little doubt that massage can hasten the recovery when splintage is used. It should be applied whenever the splint is altered or readjusted in any way. Great care should be taken not to allow the structures that have been kept in a state of tension by the splint to contract appreciably during the treatment.

For other cases, the use of the cock-up splint, of the cuff-and-collar, and of the glove and tapes has been referred to in earlier chapters.

It will be seen, therefore, that in the treatment of deformities massage plays but an accessory part at best, In this rôle it may be of the greatest possible service, and particularly before or just after operation. As time

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passes, however, its value decreases more and more rapidly, and the sooner it is supplanted altogether by exercises, the sooner the patient will recover.

A certain class of case that may have originated as a deformity or as the result of recent injury frequently finds its way into the massage-room sooner or later. This comprises the victims of cut tendons or of tenotomy. Treatment must depend entirely on what has been done and on what it is hoped may be effected. Roughly speaking, a divided tendon is joined together by fibrous tissue in about three weeks from the date of injury, and a further period of three weeks is required before this is converted into true tendon.

After accident or operation the limb is placed in position by the surgeon, and on this must depend the treatment to be meted out. Thus, if the tendon is kept by the surgeon in a position of complete relaxation, nothing may be done to move the joint upon which it acts. If, however, the position allows of movement that tends to relax the tendon still more, that movement with a return to the original position may be administered with safety. For instance, if the extensor tendon of the middle finger has been divided and the finger and wrist have been placed on a straight splint, no flexion of the finger should be allowed for three weeks, though extension of the wrist may be practised from the outset. No attempt to secure any flexion of the finger by pressure is safe before six weeks have elapsed, though pure relaxed movement may be administered from the third week. If a flexor tendon has been cut and the finger has been fixed in semi-flexion, it is safe forthwith to bend the finger further, provided that the wrist is flexed at the same time. Extension of the wrist should be left alone for three weeks, and thereafter the first attempts to extend it should be combined with flexion of the finger. No force or active movement against resistance is ever safe within the full six weeks.

If tenotomy has been performed in order that a tendon may be lengthened, then it is plainly our duty to perform every movement that may tend further to separate the

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two ends. This leads to the consideration of a natural and, so far as I know, unexplained phenomenon. Sometimes it would seem that nothing will induce the divided tendons of the hand to reunite, while nothing can prevent those of the foot from doing so. This indicates the contrast of treatment required. After tenotomy for a pes cavus or multiple hammer-toes mobilisation should be hastened with all possible speed. After suture of the tendons of the wrist we must move warily. In no class of case is skill in administering pure relaxed movement more urgently required.

CHAPTER XXVIII.

MASSAGE AS A REMEDY IN THE TREATMENT OF THE WOUNDED.

IT is often said that we have much to learn from war injuries from the purely massage point of view. As a matter of fact, not very many new discoveries have been made in the massage world during the last three years. The chief difference between military and civilian practice is this, that the conditions we used to regard as exceptional we are now called upon to treat in overwhelming numbers.

In pre-war days we were often inclined to think that two or three months of treatment was all that any individual had a right to expect, and that if he did not recover in six months the patient was either incurable or had at least received all the treatment to which he was entitled. Now we know that many of our patients cannot possibly recover in less than eighteen months or two years; and, knowing our indebtedness to the wounded, we face the prospect of prolonged treatment with equanimity. How all those that require it are to receive it, is a problem which needs no discussion here.

In other words, we are learning more fully than ever before the one great secret of massage treatment—patience.

Another thing that is new to many masseurs is to be brought into such intimate contact with the results of sepsis, and many have been the unpleasant surprises when infection has been lighted up afresh by over-vigorous treatment. Sometimes this is administered without due appreciation of the danger, sometimes merely from lack of patience. No means has yet been discovered of hastening the absorption of the pathological products

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that cripple the patient for so long a time after sepsis has intervened. Nature alone can repair an injury, and that through the circulation. The whirlpool bath owes its success to the fact that, in its use, no attempt is made to confine treatment to the injured part. Thus, if a hand is stiff and rigid, the whole limb up to a point well above the elbow is inserted into the bath. Had masseurs realised the truth of Championnière's teaching, these baths would not have gained their reputation so readily. The secret of their success is that the whole limb is treated. Championnière always taught that the important thing to remember in administering massage is to treat the whole limb, and that the injured part is the last that should receive attention. When a patient whose hand and fingers are rigid has received massage treatment for his hand alone, the whirlpool bath will hasten recovery in a remarkable manner. When, however, a patient with similar disability has received systematic massage of arm and forearm as well as of wrist and hand, the addition of the whirlpool bath to his daily treatment makes little or no perceptible difference to progress. A few cases—particularly those with returning sensation who suffer considerable pain—undoubtedly do better with the bath than with massage. These are, however, exceptional. The baths require little supervision and no labour, and therein they score.

The mechanical can rarely, if ever, equal the human agent in any form of remedial work, and so let us beware lest we ask of the baths more than we can reasonably expect. At the same time, let us take their lesson once more to heart, and remember to treat the whole of every limb that has been injured, and not only just the injured part itself. Thereby we can ensure that the injured part will receive a vascular supply adequate for its repair; without this, local treatment is obviously useless, and may even be detrimental.

Whenever there is tissue to be stretched, the very stretching is synonymous with injury. Efficient blood supply and lymphatic circulation are essential for repair,

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and, in their absence, any injury, however trifling, cannot be made good. It is thus that so many patients travel steadily down the hill in response to too vigorous local treatment.

Massage in war-time should also bring home to all masseurs the truth that underlies Championnière's whole teaching of treatment by mobilisation. "Movement is life" was the axiom underlying all his work, and, if we wish to restore the maimed finger as rapidly as possible, we must exercise shoulder and elbow to the full; if the shoulder is stiff, let us hasten its repair by prescribing full exercise for hand, wrist, and elbow.

Also we must not lose sight of the fact that sepsis is a very debilitating affair at best. This was forced home by the observation of the progress of two brother officers who were in a big railway smash in France. Both were strong and healthy men in the pink of condition, and both suffered comminuted fractures of tibia and fibula in both legs at the junction of the middle and lower thirds. One got pneumonia—only a slight attack; the other had no complication. The former is in bed with one leg fairly firm and the other quite "wobbly" still. The officer who escaped the pneumococcus has been walking about for three weeks. Here, then, is an example of the way in which sepsis can hinder repair.

The moral is plain. It is our duty to do all in our power to build up the general strength of our patients, and to this end we must encourage them to take all the regular exercise that lies in their power. A gymnasium class can well be taken, even though every man has his arm in a sling, and few are injured so severely that they cannot perform some educational exercise with advantage.

Volumes could be written on the subject—"Tommy: A psychical study." The outlook on life varies between the two following examples: "'Eart-breaking work for you, sister, ain't it, trying to get us fellows well, when none of us mean to be fit again till the war is over!" represents one extreme of thought; while the other limit was reached by the man who, having been on the

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top of the Vimy ridge for months, was invalided home as "G. S. W. femur, septic." In spite of two inches shortening and two plugs, so great was his desire to be with "the boys" when they charged down the slope of the ridge, that, hoping to hasten his recovery, he re-fractured his femur by abuse of freedom when first allowed out of bed.

"*Shell-shock*" is a phrase that has caught the public eye as something quite new. The only novelty about it is perhaps that, as Farquhar Buzzard has pointed out,¹ it is rare to find in the whole realm of medicine and surgery any term that covers such a multitude of various diseases—unless, indeed, it is "railway-spine." Grouped together under this heading we find every variety of case from the pure malingerer to cases of severe head or spinal injuries—from the insane to the man who is "fed up" and wants a week or so in "Blighty."

Buzzard classes "shell-shock" cases more or less into the following groups:—

First, "cases of pure exhaustion"—*i.e.*, men whose natural reserve of nervous energy is limited, and who therefore soon show symptoms of the lowering of the amount of nervous potential that is available for the use of the organism. These patients are pure neurasthenics and should be treated as such.

The second class contains those "who have inherited neuropathic or psychopathic tendencies, and in whom the process of exhaustion has excited these dormant tendencies into activity." This is simply expressing in other words the fact that psychasthenic soil is a fertile one on which the plant of neurasthenia flourishes. They require treatment as for neurasthenia, until this element of the combined disorder has been obliterated. The psychasthenic element can,* of course, only be treated adequately by psychical treatment.

The third group is described as consisting of "martial misfits," and consists of a limited number of men who, by temperament, training, or both, are totally unfit for

¹ *Lancet*, December 30, 1916.

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military duty. They undertake the duty with this knowledge, realising all the time that the road they are treading leads to inevitable "smash." When this arrives they are simply victims of neurasthenia, the fatigue in this instance being due in the main to the incessant outrage inflicted on their conscious mind.

The fourth group consists of men who have suffered actual concussion. Recovery may be apparently rapid, but in reality no one ever makes "rapid" progress after any severe head injury. It always leaves its echo, as it were, behind; and, unless sufficient rest is enforced (Buzzard puts it at four weeks in bed at least), the patient almost invariably exhibits some signs of neurasthenia.

The fifth group, unfortunately not a small one, comprises cases which are dubbed as "shell-shock," but which in reality are suffering from some organic (and not psychical) lesion of the central nervous system. Each calls for treatment suitable to the symptoms produced by the lesion.

The sixth group consists of hysterical cases, "who suffer from so-called functional paralysis, anæsthesia, mutism, aphonia, deafness, blindness, etc." Reference to the chapter on *Neurasthenia* will show that massage treatment is not extolled as a remedy for these cases. They are not malingerers; they are men whose personal consciousness has been lowered. They therefore require psychical treatment, not physical.

The seventh group consists of malingerers pure and simple. Of these Buzzard says, "My belief in the general honesty of the human mind leads me to the conclusion that such persons are extremely rare." Many surgeons will dissent from this opinion, but the physician is the more competent judge of this type of case. Massage for the malingerer is obviously waste of time.

When "shell-shock" is thus reduced to its component parts it becomes evident that this is no new disease created by warfare. Given accuracy in diagnosis, we are only confronted with conditions with which we are quite familiar decked out under a new title. Perhaps

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it is as well, for it is preferable that the public should regard most of these poor fellows as "shell-shock" cases rather than as suffering from hysteria and neurasthenia. But this analysis of "shell-shock" cases serves once more to emphasise that we should as a rule extend to the victims of neurasthenia not only our sympathy, but also our admiration for the magnificent fight put up, with insufficient strength against overwhelming odds, before they are finally crushed.

As the result of war injuries we are called upon to deal with a very large number of amputation cases. There is nothing particularly new about their treatment ; each case has to be considered on its merits and dealt with accordingly.

In one type, the scar is adherent and requires loosening. In another, some nerve is caught in the scar and requires to be shaken loose. If pain is due to a bulbous end, vibrations may suffice to cure, as also if the nerve is bound down by adhesions.

We may only require to restore nutrition ; but usually, whatever else there may be to do, some structures will need stretching. Whenever this is so, the case should be dealt with by gradual tension of the contracted structures while kneading, shaking, or vibration is performed. It is a tedious and tiring job, as considerable physical strength is required, and progress is seldom rapid. It is frequently possible to hasten it, however, by the prescription of suitable exercises. There are few of these cases for which some form of active exercise cannot be devised—in addition to the administration of assistive and resistive exercises. In one type, however, this is practically impossible, namely, after amputation through the upper third of the thigh. These cases are very difficult to deal with, when the problem is to restore extension and adduction. The strain on the masseur's wrists is very great, as the effort required varies in direct proportion with the shortness of the stump. It is almost essential for two people to work together : one holds the thigh of the sound limb fully flexed upon the abdomen

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so as to immobilise the pelvis, while the other performs the manipulations. So great is the strain, and so much physical exertion has to be expended, that very few cases can be dealt with daily by any pair of workers.

To overcome the difficulty we have given trial to many devices at the Military Orthopædic Hospital at Shepherd's

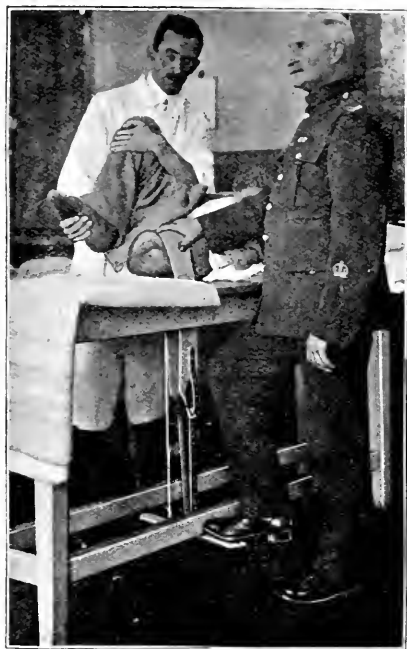


FIG. 135.—The table and apparatus in use at the Military Orthopædic Hospital for stretching thigh amputation cases with flexion deformity.

Bush. At last we have hit on a plan which bids fair to yield success. My two masseurs, Sergeant-Major Pavitt and the blind masseur, Mr. N. Webb, are now giving it a trial. Should it succeed, they and our carpenter, A. J. Hobbs, will have made a notable advance in our treatment of these very difficult cases.

Two parallel slits are cut in the top of the massage-plinth, and through these a horse-girth is passed which

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surrounds the stump. The ends of the girth are attached to a lever which can be depressed by the foot. This is also controlled by a spring. One worker then flexes the sound thigh to its full extent, while the other exerts tension on the stump by pressing down the lever with his foot. Both his hands are thus free to knead the tightened structures. The adduction is secured manually, and by altering the position of the patient's pelvis and by lateral pressure (see Fig. 135 and Appendix).¹

Throughout the pages of this book repeated reference has been made to the use of "exercises," and it has been said that nothing can replace the ordinary use of a limb as a remedial agent. No reference to treatment by exercises can therefore be considered complete unless it includes work done in the remedial workshops now being arranged in connection with Military Orthopædic Hospitals. Here the remedial agent is productive work which entails general use. Thus not only are muscular strength and co-ordination re-developed, but the psychical effect on the patient is of the greatest value. The work referred to is designed for the restoration of function and is quite distinct from occupational re-education, which, however, is no less important to many of the disabled. To H.M. King Manuel our wounded owe a debt of gratitude for his ceaseless labour in this branch of remedial work which he has made so specially his own.

¹ Since the above was written this contrivance has more than fulfilled our expectations.

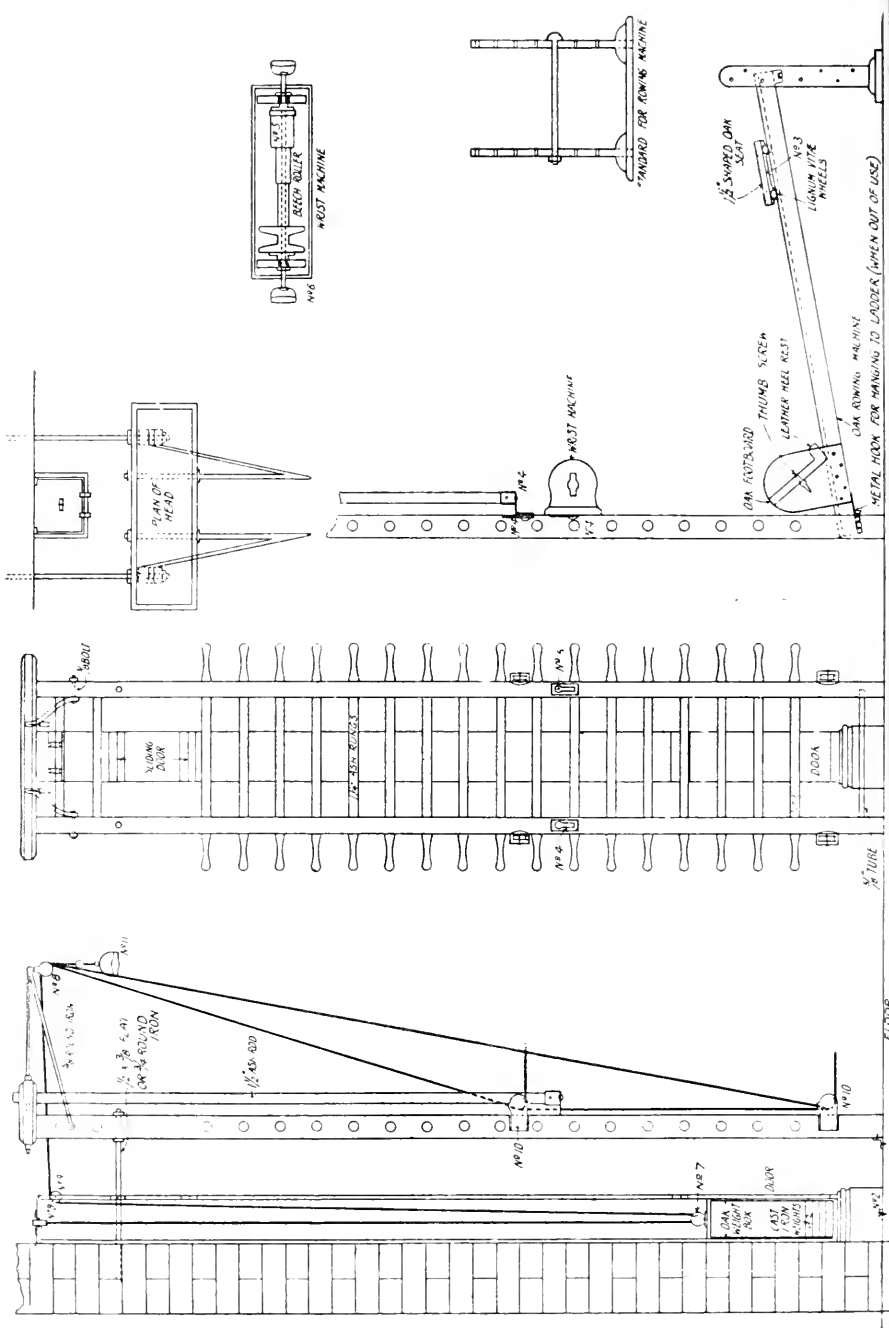
APPENDIX.

THE apparatus here described is not identical with that illustrated in the text. It represents an improved design (see photograph).

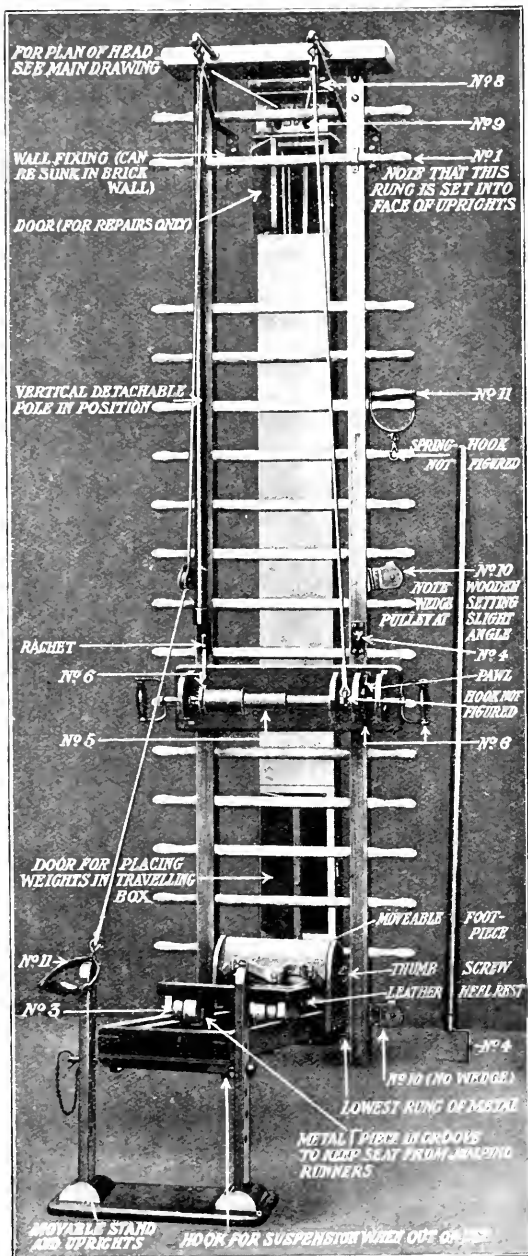
When Colonel Robert Jones did me the honour of asking me to take charge of the Massage Department of the Military Orthopædic Hospital, Shepherd's Bush, I had already seen enough of military practice to be able to realise the relatively small part that massage pure and simple should play, when compared with the vast scope that was open to us for treatment by exercises. It was also apparent that it was quite impossible to secure the services of an adequate number of fully-trained medical gymnasts to look after my prospective patients, and that, therefore, something had to be done to provide the staff with some scheme of exercises which they could master satisfactorily without prolonged training.

The use of apparatus was thus indicated, but it became apparent that, if we equipped our department with the usual outfit, there would be such constant moving about from one piece of apparatus to another that the inconvenience would be very great to all concerned.

I then conceived the idea of elaborating a sort of *multum in parvo* apparatus, and it was at this stage that I first called to my aid the assistance of A. J. Hobbs (A.M.I.C.), R.N.A.S., formerly carpenter to the Hammersmith Guardians. Stage by stage, through months of laborious work, he has helped me to perfect the apparatus here figured. Without his aid my scheme would never have materialised at all, whereas now I hope that before long it will be widely installed in various hospitals other than our own. Many hundreds of our wounded owe him much ; thousands will do so before all the tale is told. It is to his pen that I am indebted for the whole of the drawings here shown to scale.



FIGURES INDICATE NUMBER OF PARTS



(The figures refer to the detailed drawings,
p. 349 *et seq.*).

Appendix.

The scheme is perfectly simple. The *pièce de resistance*, as it were, is a combined vertical ladder and peg-post. Two rungs of the ladder are omitted near the top to allow of backward hanging. The rung above the gap is set into the front of the uprights, and not as shown in the drawing. The place of the lowest rung is taken by a metal bar, which serves to support the sliding-seat, and is also of frequent service in various foot exercises.

On the face of the ladder are four metal slots (two only are figured for the sake of simplicity). Into the upper pair can be slipped the lower metal attachment of two vertical poles, while the upper ends pass through the wooden plate that forms the top-piece of the ladder. These not only provide loose rods for the performance of pole exercises, but also enable a patient who is unable to rotate the forearm into pronation, to perform almost every exercise on the ladder.

Into the lower pair of slots can be fitted the metal pins that are attached to the back of the wrist machine. This is a very simple apparatus, and has the great advantage over those usually found upon the market, that the resistance is adjusted by attachment to the weight and pulley apparatus, instead of being regulated by friction. To the base of the hollow wheel (shown at the left of the roller) is a small metal hook (not shown) to which can be attached one end of the pulley cord. To the right of this will be seen the roller which is arranged in three thicknesses. A ratchet at one end and a pawl at the other regulate the direction of movement. It is used thus. A patient with stiff fingers is first instructed to place the injured hand on the thickest part of the roller, and, with the sound hand pressing upon it, he simply rolls the hands to and fro. The weights meanwhile are unattached. The process is repeated on each of the two thinner portions as well, and then the thumb is slipped under the thinnest part of the roller, the fingers passing over it. This represents the first attempt to secure a true grip. The two larger portions are tackled successively, and then the weight is attached. The patient now learns to pull up the weights

Appendix.

by means of rolling in either direction, and a useful exercise can be added by releasing the pawl and ratchet together and resisting the return of the weight to the ground by the grip alone.

Rotation exercises can be arranged for pronation and supination of either arm by means of the handles at the end (see Fig. 56, p. 118).

The weight-and-pulley apparatus is also simple. Six pulleys are attached to the ladder, three on either side. One is set forward by an iron rod so that it projects over the head of the patient. The other two are attached to the side of the ladder, the lowest near the floor, the other about one-third of the way up. Behind the ladder is a long wooden box, within which is fitted a smaller travelling box containing the metal weights. On the top of the latter is a twin pulley. The cord to which the handle is attached by a spring-hook (not illustrated) passes over the overhead pulley to a second pulley placed on the front wall of the main box. Thence it passes down to the twin pulley on the top of the travelling-box, up to a third pulley on the roof of the main box, down to the other side of the twin pulley and up to a second pulley placed on the front wall of the main box. From this the cord passes out over the second overhead pulley to the second handle. Thanks to the use of the twin pulley the cord is long enough to allow full use of the apparatus, even if the cord on both sides is led down from the overhead pulleys and behind either of the pulleys attached to the sides of the ladder. The various possibilities are shown in the first drawing. The weights are placed into the travelling box through the lower of the two doors shown in the main box ; while the second or upper door is required solely for the purposes of repair should the rope wear out.

The sliding-seat apparatus consists of a seat provided with four wheels, two on either side, which rest upon two parallel rails. These are joined together by crossbars and the path for the wheels is slightly sunk. From the under surface of the seat projects a pair of right-angled metal bars, the free ends being lodged in shallow grooves

Appendix.

on the inner sides of the rails. These ensure that the seat will not "run loose" over the side of the rails.

One end of the rails rests upon the metal rod already mentioned as taking the place of the lowest rung of the ladder. The other end rests similarly on a corresponding rod which passes through two wooden uprights. The latter are supported on a movable base-board, and are drilled with seven holes placed opposite to each other. It is thus possible to raise the inclination of the rails from the horizontal to a very considerable angle. To the sides of the rails near the ladder are attached a pair of semi-circular uprights through which pass a horizontal metal bar. This can rotate freely, but its movement can be controlled absolutely by means of a thumb-screw. To the front surface of this bar is attached a plain piece of wood, fitted along the lower border with semi-circular heel rests. This provides a foot-piece that can be adjusted to any angle. It will be seen, therefore, that this apparatus possesses two great advantages over the common marketed designs, namely, that the inclination of the rails can be adjusted to the most suitable angle, and that the foot-piece can be placed in the most advantageous position.

When not in use the loose poles can be suspended from two slots placed one on either side of the top of the main box; the wrist-machine can be suspended from a short metal rod attached to the side of this box, and this runs through a circular hole cut in the wooden back-support of the apparatus; while the under surface of the rails of the sliding-seat apparatus is provided with a metal hook on either side which can be fitted over one of the rungs of the ladder.

The main drawings are shown to a scale of $\frac{1}{2}$ inch to 1 foot, and the numbers refer to the figures on the subsequent pages. These detailed drawings are all shown one-third full size.

The last drawing (No. 12), drawn to a scale of $\frac{3}{8}$ inch to 1 foot, shows the details of the table we are now using for the flexion of amputation stumps. It has been fully described in the text (see p. 34).

Appendix.

TURNED ASH RODS $\frac{1}{4}$ " MUST BE TURNED PERFECTLY TRUE LENGTH 2'5"
Nº1



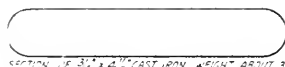
Nº2



2 $\frac{1}{4}$ " X $\frac{3}{8}$ " STRAPS DRILLED AND COUNTERSUNK

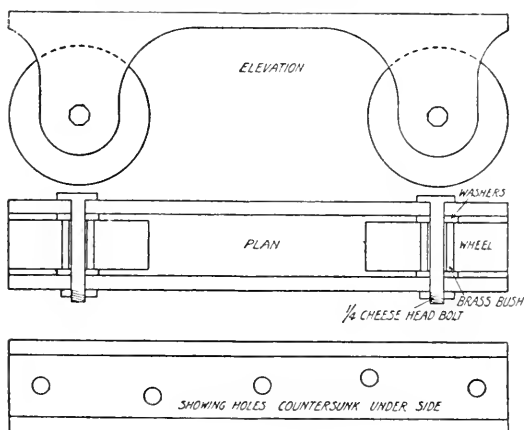


SECTION OF 1" X $\frac{1}{2}$ " CAST IRON HEIGHT ABOUT 6 LBS.

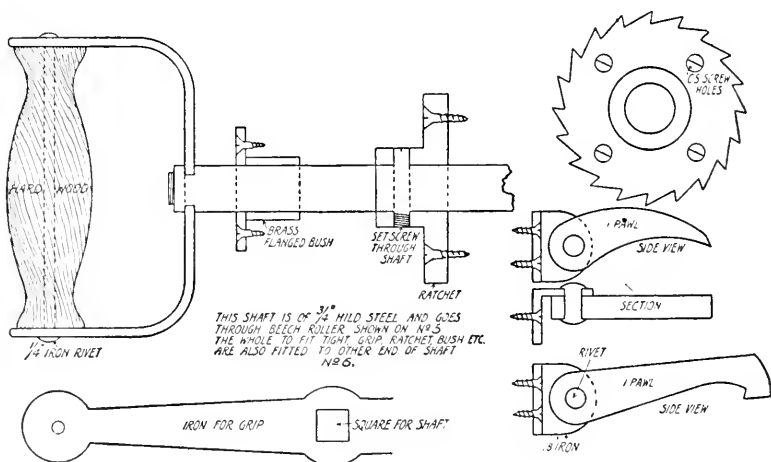
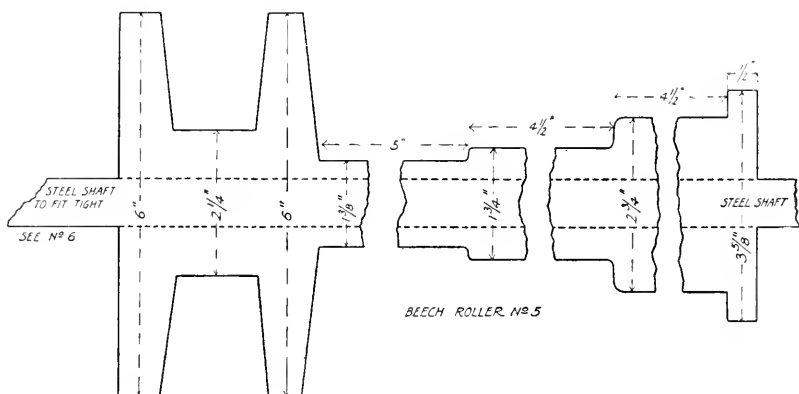
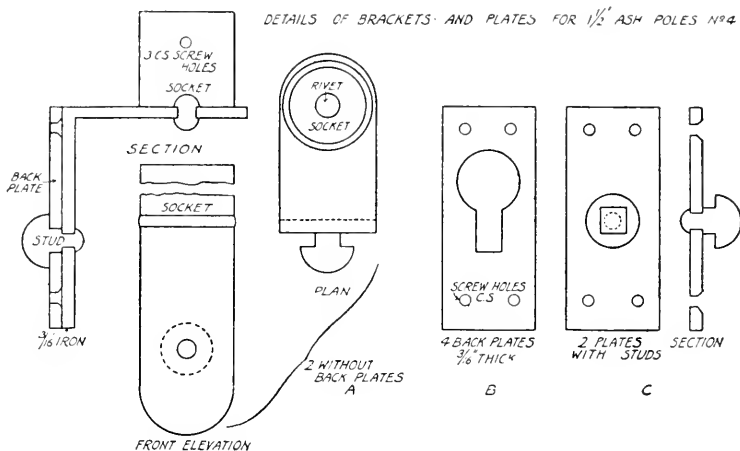


SECTION OF $\frac{3}{4}$ " X $\frac{1}{2}$ " CAST IRON HEIGHT ABOUT 3 LBS.

DETAILS OF CAST IRON RUNNERS WITH METAL
BUSHED LIGNUM WHEELS Nº3

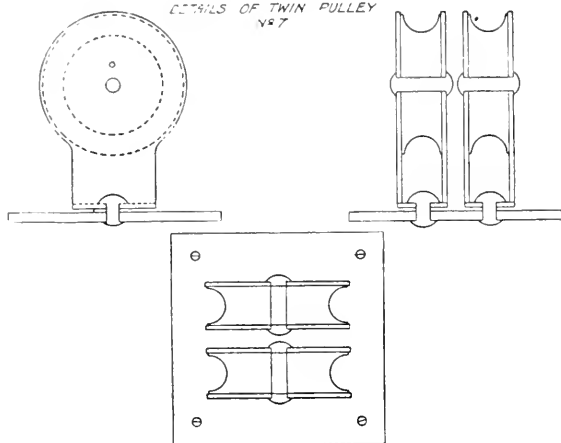


DETAILS OF BRACKETS AND PLATES FOR $1\frac{1}{2}$ ' ASH POLES NO 4

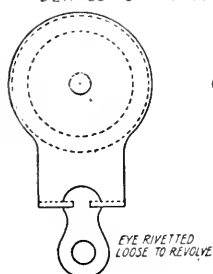


Appendix.

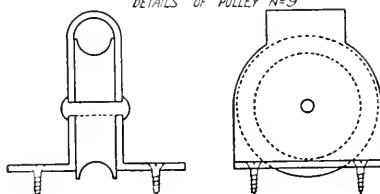
DETAILS OF TWIN PULLEY
Nº 7



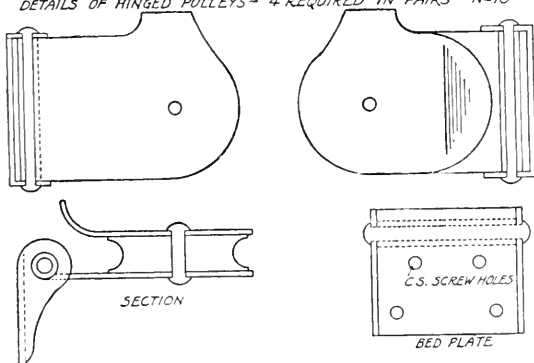
DETAILS OF PULLEY Nº 8



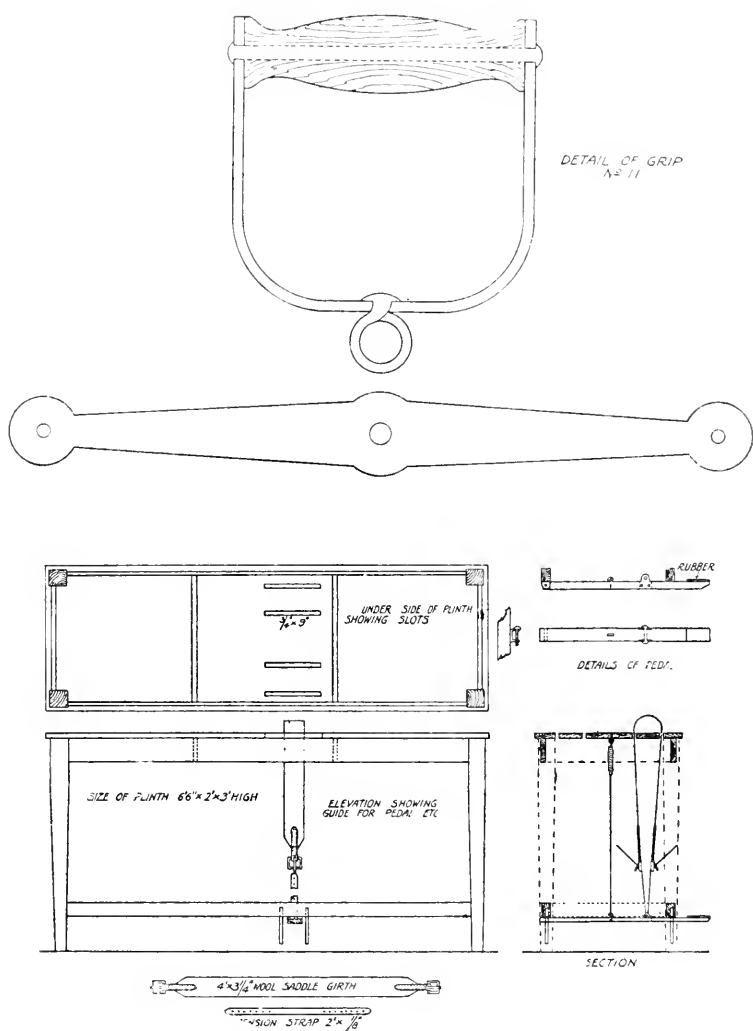
DETAILS OF PULLEY Nº 9



DETAILS OF HINGED PULLEYS- 4 REQUIRED IN PAIRS Nº 10



Appendix.



DETAILS OF CONSTRUCTION OF THE TABLE USED FOR
STRETCHING AMPUTATION STUMPS.

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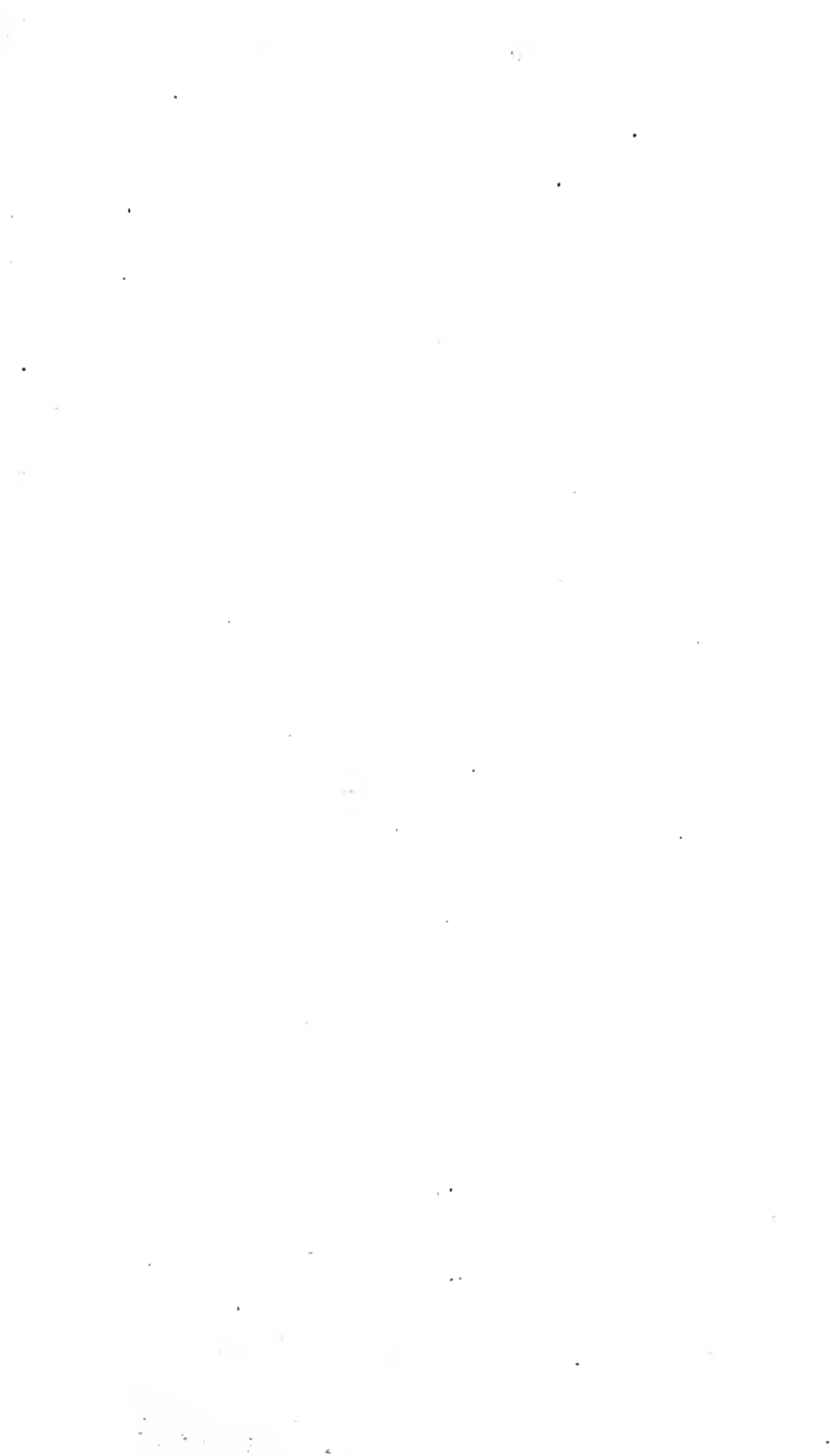
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